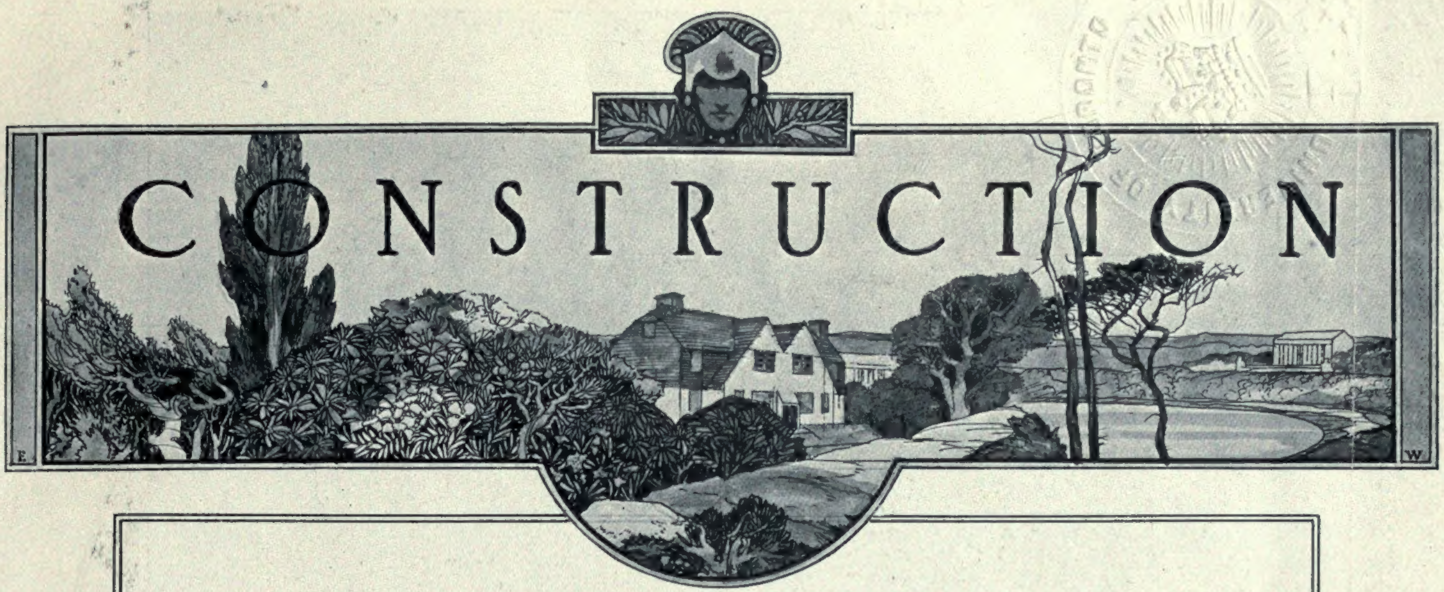
UNIV OF
TORONTO
LIBRARY

P
Technol
A.D.



CONSTRUCTION

January, 1914 Vol. 7., No. 1

CONTENTS

EDITORIAL 3

The Panama Canal and the Panama-Pacific Exposition——Need of a city planning exhibition in every Canadian city——Zone system key to concentration and congestion——Royal Gold Medal for 1913——Excavations of art work in historic places.

THc NEW ART GALLERY, MONTREAL 7

CRAWLEY COURT, HAMPSHIRE, ENGLAND 17

THE ROYAL GOLD MEDAL FOR 1913 23

CURRENT TOPICS 29

Matusnosuke Moriyama's opinion of American architecture——Thomas Hardy, recipient of Nobel Prize, an architect.

Full Page Illustrations

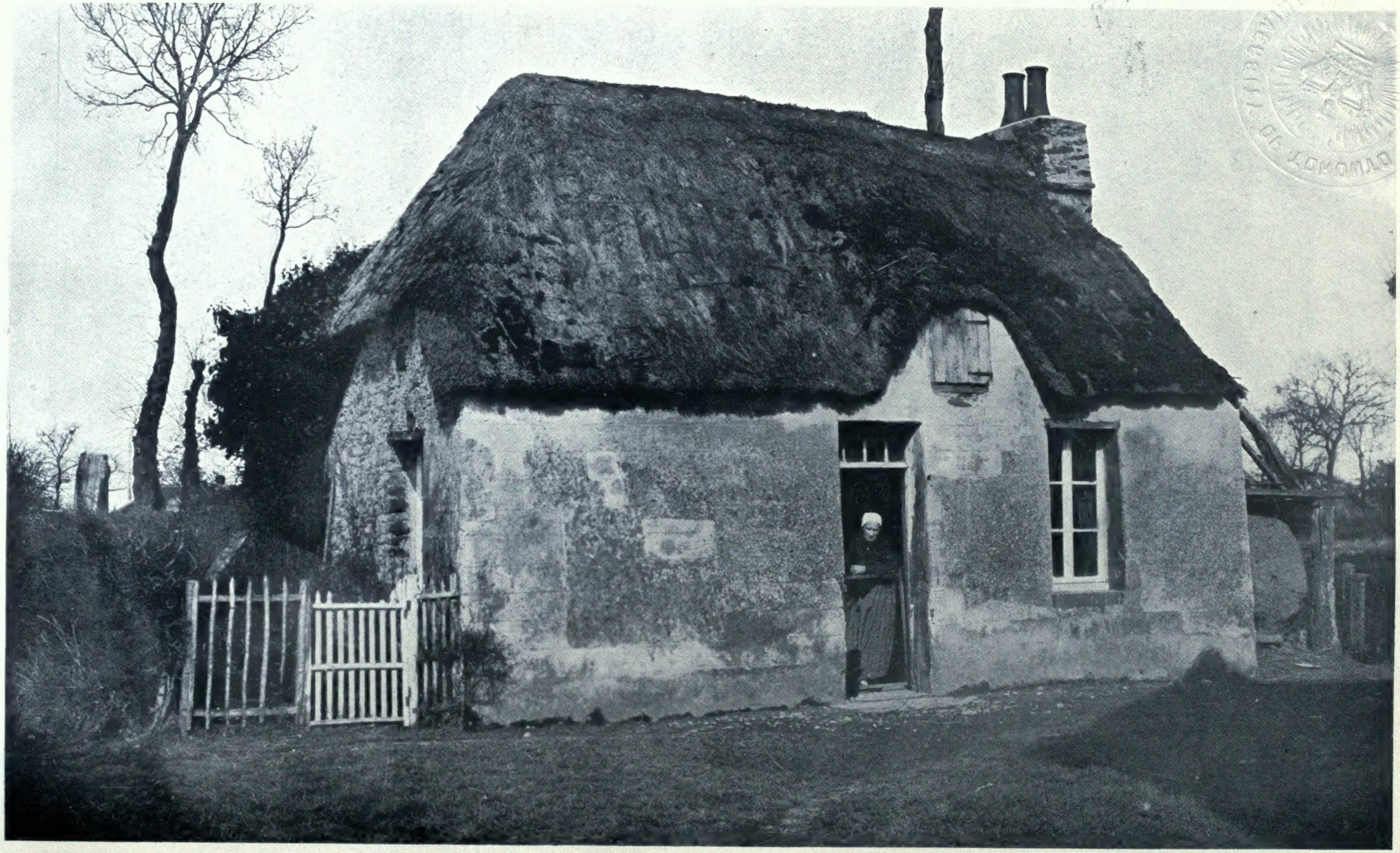
A PEASANT'S HOME, NORMANDY, FRANCE .... Frontispiece

THE NEW ART GALLERY, MONTREAL .... Plates I-VIII

$1.85-

136531
28/6/15

H. GAGNIER, Limited, Publishers
GRAPHIC ARTS BLDG., TORONTO, CANADA
BRANCH OFFICES:
MONTREAL WINNIPEG CHICAGO NEW YORK



A PEASANT'S HOME,
NORMANDY, FRANCE.
PHOTO BY F. R. MAJOR.

EDITORIAL

The Panama Canal—Viewed from an engineering standpoint; also in respect to sanitation—The Panama-Pacific Exposition in honor of its completion.

THE PRESENT AGE will live as a period of invention and achievement. Scarcely a day goes by during which the wireless does not announce to the world some remarkable accomplishment. So accustomed are we to reading such accounts that the unusual often fails to receive more than a passing reflection. Probably the greatest engineering feat of recent years and in fact of all ages is the Panama canal. Practically finished and ready to revolutionize the commercial activities of the whole world, this fifty-miles channel stands as a monument to the rapid and substantial progress of engineering.

This tremendous undertaking reveals itself now as a broad strip of clear water. The locks represent a work of infinite skill and ingenuity; the excavated portions depict the despatch and facility of modern methods; the Gatun Dam with its huge spillway and hydro-electric plant stands as one of the engineering sights of the world.

The whole character of the peninsula has changed; the swamps and fever-breeding districts having been eradicated, while the cities of Colon and Panama are well paved and made thoroughly sanitary. Groups of picturesque buildings surrounded with palms line the canal course and it is safe to predict the healthful and enjoyable conditions in the future of this narrow neck of land.

In honor of the completion of this vast undertaking will be held the Panama-Pacific International Exposition in San Francisco, 1915. The architecture of the main buildings will symbolize the union of the two oceans. For one-half a mile the encircling walls will present a facade on the water front representing the romance of our early days embellished with sculptured likenesses of Columbus, Balboa, Pizarro, Cortez, Ponce de Leon, De Sota, and others who endured the hardships of a new and hostile country. The world expects an artistic ensemble to this Exposition unequalled up to the present time and these expectations will more than be realized if the present efforts are a true indication of the completed work.

The great need of a city planning exhibition—An opportunity for the Government to benefit the æsthetic, social and economic interests of Canada.

PROGRESS is founded on knowledge and the scientific handling of existing problems. The nation advances in ratio to its enlightenment among the people in general, for it is upon them that the burden of a country's greatness rests. Given the advantages of past experience among all races in every age, there should be no excuse for serious mistakes unless the matter at hand be an entirely new problem. If such be true then the far-sighted Government is the one which seeks to educate her people and especially those of the smaller cities and towns where the questions of to-morrow will be similar to those already handled by large and compact communities.

Considerable interest is being manifested in the planning of our congested centres, a matter of considerable embarrassment to the large cities throughout the world. The same mistakes should not be made in the new and rapidly growing municipalities of Canada. Let us give them the opportunity of seeing and studying the various schemes which have either resulted in the evolution of a beautiful and practical city from the beginning, or which have changed the chaotic growth of a thoughtless community into a dignified and artistic plan. Why not make a careful selection of drawings and photographs? Have them representative of the best work which has been accomplished in Germany, France, England and the States. Let them treat of all phases in city planning from the layout of bridges, markets, parks and playgrounds up to the comprehensive study of large cities. A collection of this nature could be secured and would unquestionably prove of immense value to the average layman as well as to the professional and administrative authorities.

We see no reason why the Government should not make a move in this direction. It should do this not only because it would be of universal interest to the people, but would also educate them to love the beautiful and adopt measures whereby the city would save the tremendous cost and torn-up conditions resulting from a lack of such knowledge. New projects for civic improvements could be more easily settled and handled in a masterly and satisfactory manner if the similar ideas already executed in other places were brought to the attention of those to whom the undertaking has been entrusted. All material and physical advancement would be the outcome of a harmonious and sane plan conducive to the best interests of the whole community.

Sufficient pressure might be brought to bear upon the proper authorities through the Dominion Conservation Commission which meets in Ottawa on the twentieth of this month; also at the City Planning Convention to be held in Toronto, June 1-3. The Conservation Commission has already appointed a committee to draft a model city planning and housing act as a suggestion to the Provincial Governments. In this way the great immigration problem can be settled, the present unsanitary conditions eliminated and a sane growth guaranteed.

Concentration of capital and congestion of thoroughfares well regulated in German cities—The zone system now successful in many European countries.

THE PROBLEM of concentration seems to be the key-note of the present age. Our large cities are carefully considering the question of tall buildings from the standpoint of economy, congestion and sanitation. In doing so the thought of colonizing certain interests should not be overlooked and if the question is properly analyzed it will be seen that large commercial institutions must be housed within the smallest area possible. This would lead us naturally to the evolving of a scheme whereby all the objectionable points could be eliminated and at the same time provide suitable accommodations for the steady growth of commercialism.

The cities of Germany furnish striking examples in this connection. As far back as 1875 Baumeister, a theoretical city planner, evolved the idea of the zone system. By this method the individual character of the different parts of a city is recognized and the height, density and plan of a building allowed accordingly. In Berlin the ordinances allow buildings of five stories with an area covering seventy-five per cent. of the building lot in the city proper, and in the near-by suburbs two stories and thirty per cent. of the ground area. Their regulations by zones have helped to make effective the sanitary conditions of the city.

The chief objection to the scheme in Berlin comes from the business world, which claims that the buildings should be taller in order to permit of the centralization of capital. This cry might not be necessary if the whole structure at the present time were used for business, but even in the main thoroughfares the upper stories are used as dwellings. It is very seldom one finds a business block containing no living quarters. Transplant the home seekers to their proper zone and the great drawback to Berlin's trouble would be in part, if not entirely, adjusted.

Would it not be a wise plan for our large cities to study the advantages of the zone system? Instead of setting a certain height for structures which can be built in every part of the city, let the regulations cover the needs of the various sections. This would prevent the shopping district from suffering on account of the additional congestion of tall office buildings; it would also protect the residential streets from the tall apartment. As each city of a certain size develops districts it would be wise to express their difference by building regulations conforming to their diversity of character. For is it not self-evident that the commercial district and the residential section should each be protected from unjust encroachment through the lack of proper by-laws?

The Royal Gold Medal for 1913—Its value to the recipient as well as the benign influence resulting to the profession—Honor bestowed on all peoples.

THE ROYAL GOLD MEDAL is given annually by His Most Gracious Majesty the King to the architect, or man of science and letters with architectural instincts who is deemed most worthy of such an honor by the Royal Institute of British Architects. The presentation furnishes an occasion of extreme importance in the artistic field of England and is accompanied by dignified ceremonies. For such a reward in recognition of distinguished services to architecture tends to elevate this phase of art and bring its refining qualities forcibly before the people. One cannot overestimate the value of such an honor as an incentive towards a wholesome and conscientious endeavor upon the part of the recipient, as well as the other members of the profession, to build for art's sake, eliminating the baser motives which often evidence themselves in modern work. It is also worthy of note that such merit is not confined to the narrow bounds of England but may be, and has been, conferred upon men of foreign nationalities whose life and energies are devoted to the pure and broadening influences of their work. Reginald Blomfield, the recipient of the Royal Gold Medal for 1913, deserves the honor bestowed upon him as his work will exert a lasting influence upon the efforts of future generations. His address in response to the presentation of the medal is given in this issue, and reveals the character back of the man who has so deservedly won this high distinction.

Excavations made in public places—Works of art discovered which connect the illustrious ages of yesterday to the present in a decisive manner.

SO ENGROSSED do we become at times with local affairs that the real import of foreign events scarcely receives our thoughtful attention. During the past few years the museums of the world have added many valuable examples of art to their already famous collections. The race who ruled yesterday is depicted to us through graphic descriptions and we marvel at the intimate knowledge of the author with the subject in hand. Back of his cleverness, hidden as it were by the vivid and entertaining treatise, lies the source from which he derives his knowledge. Isolated in regions which live with memories of the illustrious past are groups of men representing the various countries whose ambition is to unearth some secret hidden for centuries. These men are young, energetic and well educated, with a keen love for archæological links which alone can unite the past to the present. How successful they have been is revealed by the tombs, temples, palaces, statuary, jewels, pottery and inscriptions dating back beyond the period of 2,000 B.C. H. E. Winlock, of the Metropolitan Museum of Art, New York City, who has spent seven seasons digging among the historical places of Egypt, gave to the museum recently a huge door jamb which came originally from the large red granite temple built by Rameses the Great. This stone is covered with hieroglyphics and immediately becomes one of the priceless discoveries which are enlightening us as to the hidden past.

Another sensational announcement comes from Professor William Niven, who claims to have discovered within a short distance of Mexico City, sufficient Mongolian relics to prove a civilization preceding that of the Toltecs and the Aztecs. The expedition under Prof. Niven with the financial assistance of the Mexican government, unearthed the city of Otumba beneath the ruins of the ancient Tootihuacan. Among the evidences of a high state of civilization is a pyramid seven hundred feet square at the base, with its apex one hundred and ninety feet high; a house, the walls of which are richly painted in green, red, pink and brown colors displaying the elaborate garments and head dresses of the people. Directly beneath Otumba a third city was found with tombs representing a civilization beyond calculation. Here was found the image of a Chinaman in a tomb beneath two other races which, as Prof. Niven suggests, may solve the enigma of the New World's beginning.

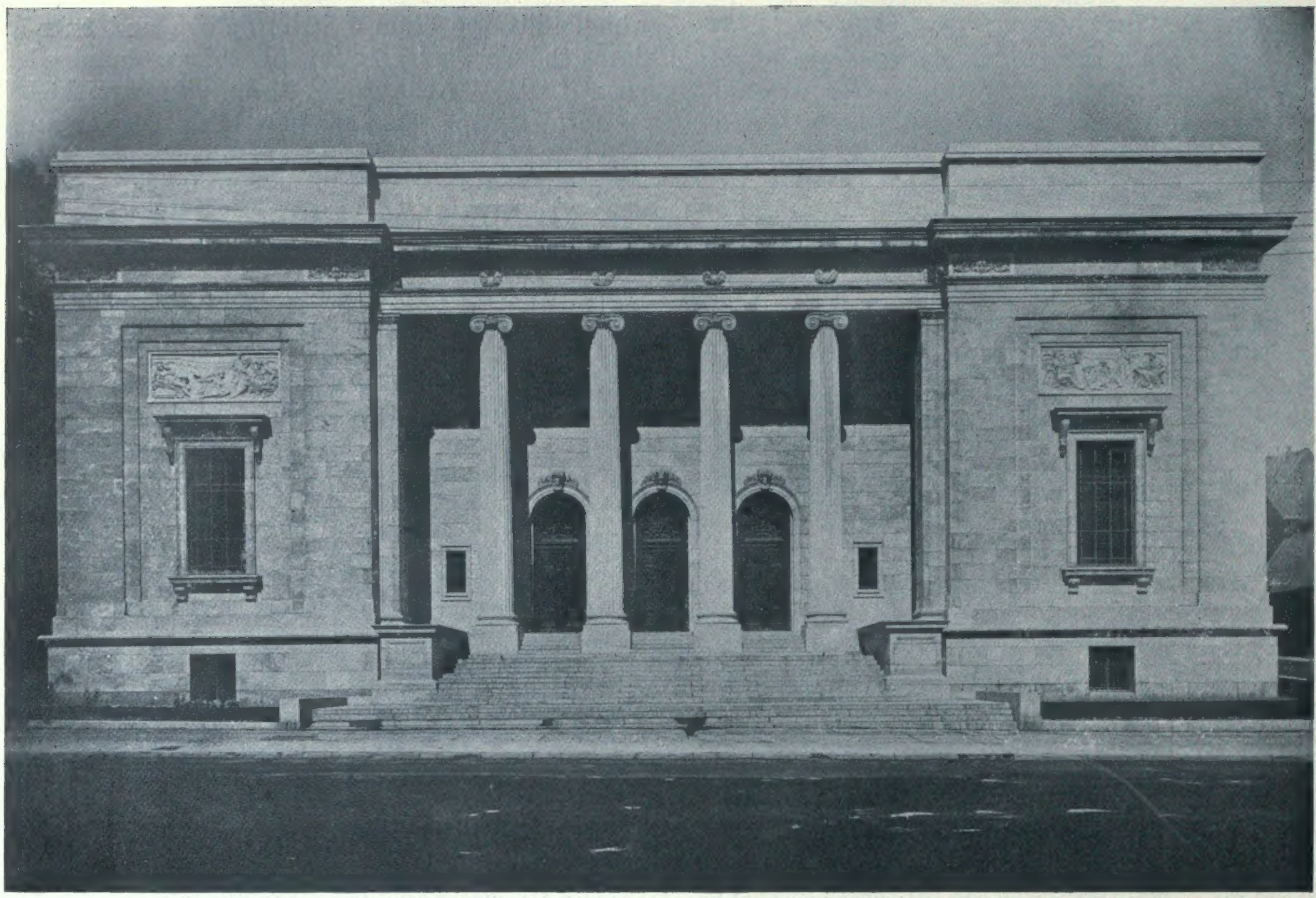
During the third expedition conducted by the University of Pennsylvania, a tablet was found which tells the story of the deluge and antedates the Biblical account by fifteen hundred years. Dr. Arno Poebel, a distinguished Oriental scholar, has deciphered the Babylonian tablet in addition to hundreds of others which refer to historical events before and after the flood. Here are found the essential facts as told of the creation and flood in the book of Genesis.

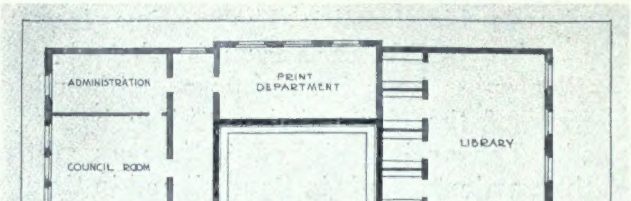
For many years the archæologists of the world have been searching for the Sabine Farm, celebrated as the home of the great poet, Horace. At last the villa given him by Maecenas has been authentically located at the foot of Mount Lucretile, near Licenza. It is rectangular in form, surrounded by a double wall for the prevention of land slides. The garden which occupies four-fifths of the surface is enclosed by an arched gallery in the centre of which is a large swimming pool. Broad steps lead to the vaulted portico, thence into the house, which was divided into two parts, one for Horace and his guests, the other for the slaves. Finely cut mosaics, beautiful sculptured marble, etc., have been found in abundance. Bricks have been found with the inscription of *"Numeri Nevi,"* which are the oldest known to Latin archæologists.

M. Vaglieri, director of excavations at Ostia, tells of the theatre, temples and shops unearthed under his direction. The meeting places of the various guilds, the forum, market place and other spots have been exposed, although four-fifths of the city remains still to be excavated. The ancient city of Ostia may still rival the wonderful finds in Pompeii and in time reveal the wealth of former days when the Emperors embarked to conquer the Mediterranean.

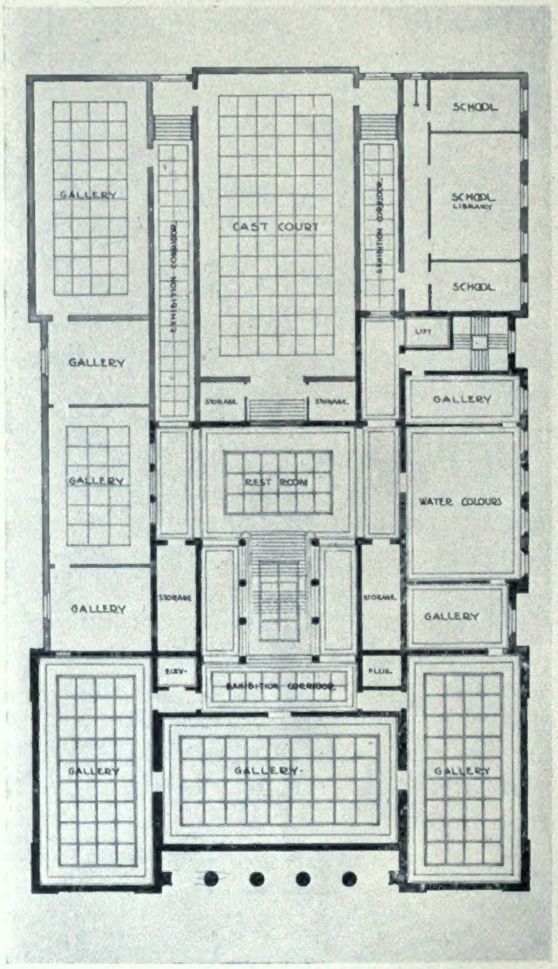
At Acqui the excavators found a solidly-built rectangular brick basin of large dimensions, surrounded by three steps leading from the water. Near by was a smaller basin, used for hot mud baths with two caves for conserving the mud. As this town is famous for its hot sulphur water, we can see how the modern system of hot mud and sulphur baths is similar to the old Roman idea.

Others of equal importance are taking place in all countries, making authentic our historical events, although changing some of the minor details. From the record of the past decade it might safely be said that in years to come only the future will remain a mystery, and our efforts will then strive to accomplish future prophecies. In doing this we will once more draw away from the purely commercialistic spirit and work for art's sake, producing with the thought of future generations and eliminating the perishable construction of to-day. Then we will appreciate the sacrifices made by our present day excavator.





GROUND FLOOR.



FIRST FLOOR.

THE NEW ART GALLERY, MONTREAL.

EDWARD & W. S. MAXWELL, ARCHITECTS.

The New Art Gallery, Montreal

Edward & W. S. Maxwell, Architects

THE New Art Gallery was officially opened in November, 1912, by His Royal Highness, the Duke of Connaught. On that occasion there was shown a remarkable loan collection of paintings, representing the more important schools of the Renaissance as well as those of modern times. The erection of a building in which paintings and sculpture can be shown in a suitable environment, without crowding, has resulted in an increased interest in artistic matters and a material growth in the membership of the Association.

The selection of the Architects was the result of a well conducted limited competition. The late Edmund M. Wheelwright, owing to his connection with the new Boston Museum of Fine Art, was selected to advise the building committee. The data collected by him in Europe and America and the conclusions arrived at as a result of experimental research previous to the erection of the Boston Museum, was placed at the disposal of the architects of the Montreal building, with the result that the planning and lighting are considered most satisfactory, and in some respects, are improvements on the older examples.

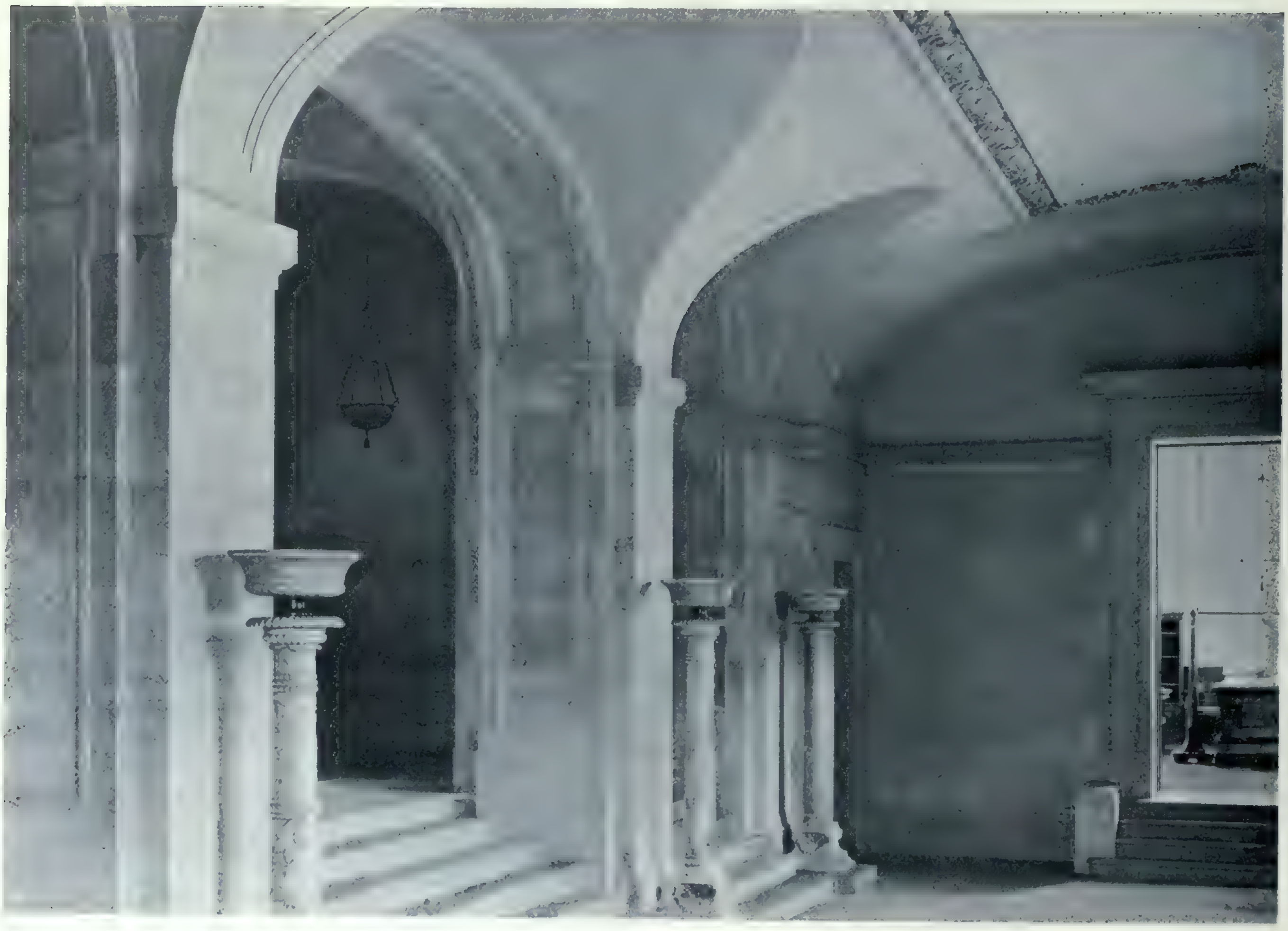
The Museum is situated on Sherbrooke street in the heart of the residential district. The present construction represents about two-thirds of the original scheme and the additions can be made without disturbing the plan or usefulness of the existing structure. Accommodation is provided for the exhibition of paintings, sculpture, and objects of art, a library, a school of art, and the necessary administration and utilitarian offices.

The exterior is of classic character, and there is evident a frank acceptance of conditions of lighting demanded by the introduction of side lighted galleries, and top lighted studios for the school of art. The feature of the Sherbrooke street facade is a large portico with Ionic columns. Three arched entrances of rather Roman type are embellished with key stones having symbolical heads. The doors of oak are surmounted by bronze grilles. Figures symbolizing the Arts are flanked by acanthus scrolls, the surrounding grille work being rather open in type in order that light may enter into the vestibule and hall.

The wide flight of marble steps is flanked by pedestals which may receive groups of sculpture in the future.

The projecting wings express the interior, the large windows which light the library and exhibition room for case objects have panels of

ALABASTER LIGHTING STANDARD.



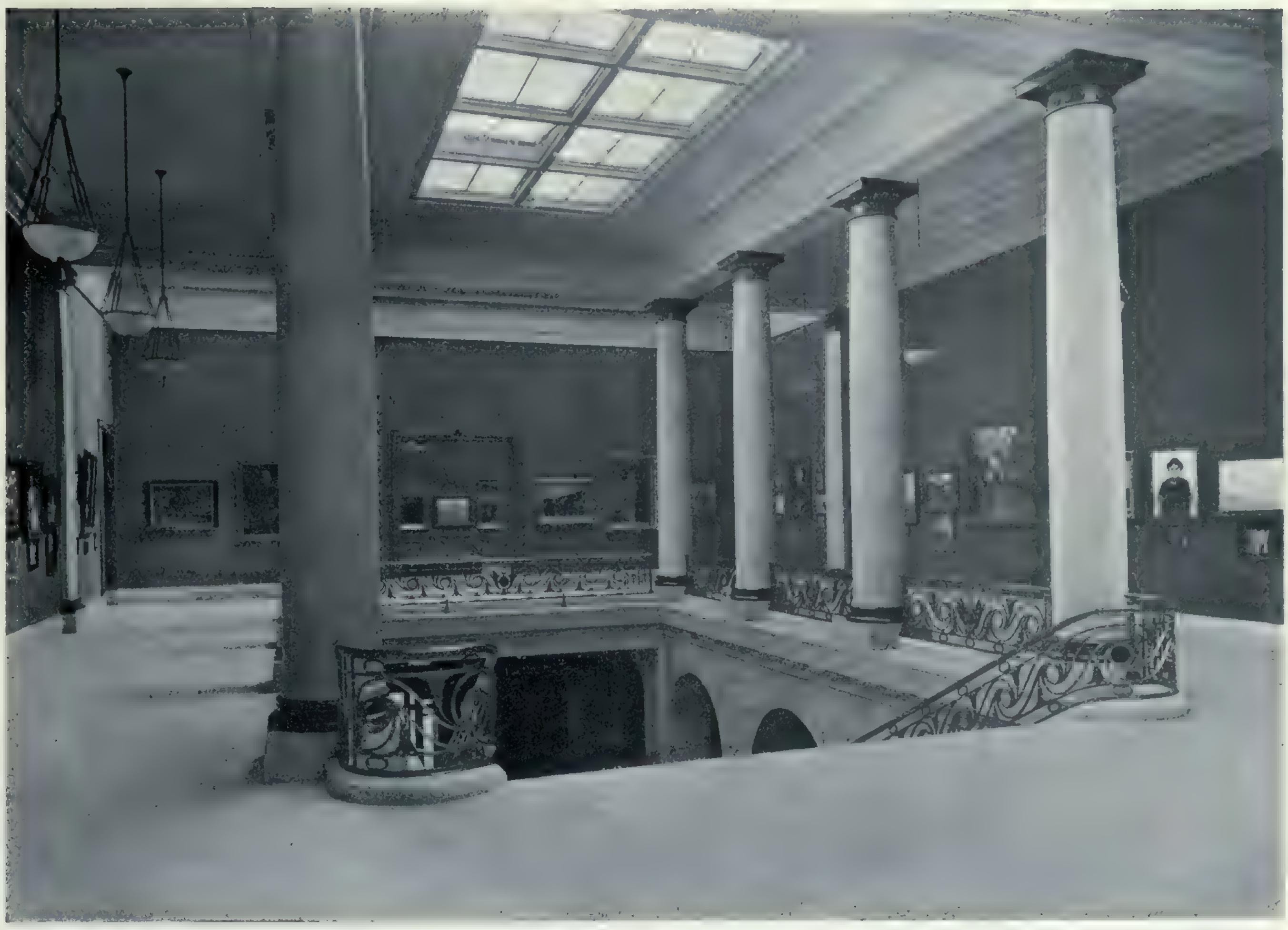
MAIN ENTRANCE HALL.

ENTRANCE TO GALLERY.

sculpture in low relief carried out by the Bromsgrove Guild of Canada under the architects' directions. These panels are conceived in the best spirit of the art and represent the traditions of Greek and Roman art being explained to groups of sculptors, artists, painters, etc. The difficulty of obtaining unity in panels of such size and shape has been accomplished by the introduction of a colonnade in the background. This touch, rather Italian in inspiration, is successful in execution. There are three top lighted galleries on the first floor, the skylights being screened by the plain attic.

The Ontario avenue elevation is two-thirds completed, the central wing has large windows lighting the ground floor rooms, those of the first floor open into side lighted galleries. The studios of the Art School are frankly in evidence, the U-Bar construction, usually confined to greenhouse practice, has been used with success. The studios are very well lighted and the curved eaves permit light to enter them when most desirable and do away with the ice and snow troubles incident to the usual cornice at the intersection of the sloping and vertical surfaces of glass. The future wing will in mass balance the south one, but the character will be different owing to windows required for the ground and first floors.

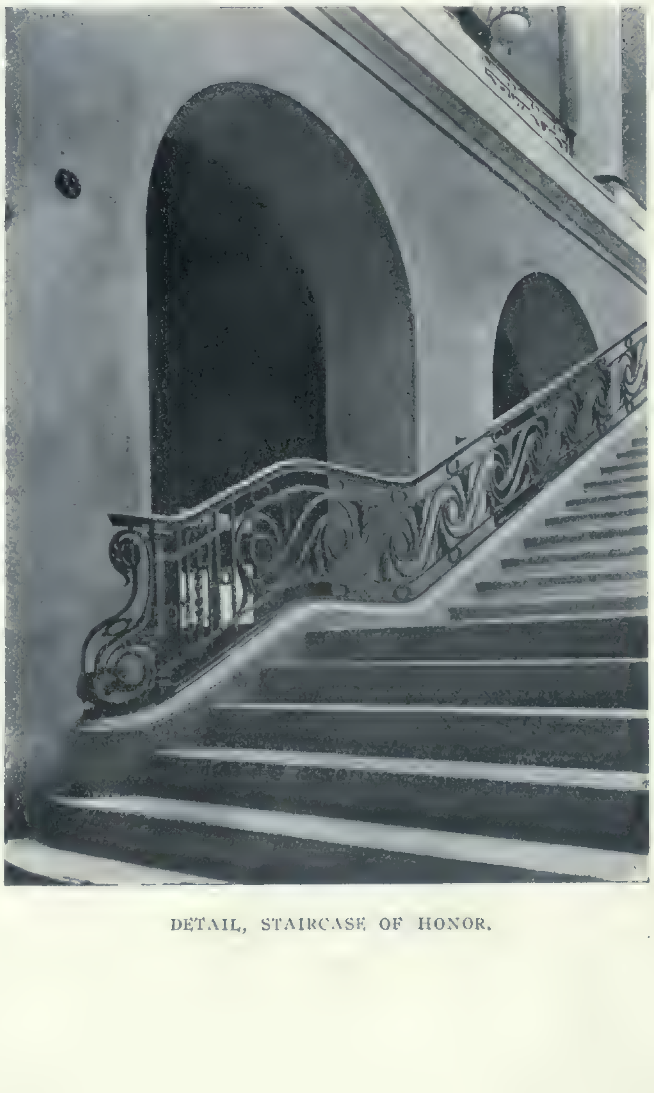
The ground floor is reached from Sherbrooke street by the steps and three portals already



STAIRCASE OF HONOR.

described. The oak entrance doors stand open in day time and double swing glazed doors of light construction take their place in the entrance hall. This entrance hall extends across the greater part of the building, the staircase of honor which is magnificent in scale ascends directly opposite the entrance, ending at the first floor in a large rest room provided with tables, chairs, palms, etc. While used as an exhibition gallery, it, by means of alcoves, provides a place of rest where one can view a great part of the first floor, the staircase, entrance hall, etc., the view thus obtained being very comprehensive and interesting. The whole of the above portion of the interior is built ot solid pavanozzo marble, the columns having solid bronze bases and capitals, while the railing of the staircase is of a similar material in a richly wrought pattern. The ceilings of the entrance hall and surrounding passages are vaulted and decorated, while the lighting is by means of eight carved alabaster columns and bowls which give a diffused, soft light that is most agreeable and effective.

It is of interest to note that one can make the circuit of the six galleries and hallways on the main exhibition floor without retracing one's steps. There is, therefore, always a new note of interest in going from one gallery to another, that one misses in a less skilfully planned structure.



DETAIL, STAIRCASE OF HONOR.

DETAIL OF GALLERY SEAT.

The apartments for teaching are very complete, consisting of three large side and top-lighted studios, cast rooms, modelling room, lunch and other rooms, for which accommodation is found in portions of the building apart from that used by the public.

In the construction of the building, nothing but the highest grade, of a fireproof character, was used. The system of ventilation, heating, lighting, vacuum cleaning, etc., have all been carefully studied and adapted to suit the exacting conditions of a building of this nature, with perfect success in each case.

As one inspects the building, however, critically, there is forced upon one the feeling that a quiet but forceful reserve has been brought to bear upon all the intricate carefully studied details that go to compose the whole, a reserve that showed latent force and intuitive knowledge, and how to apply it to the best advantage.

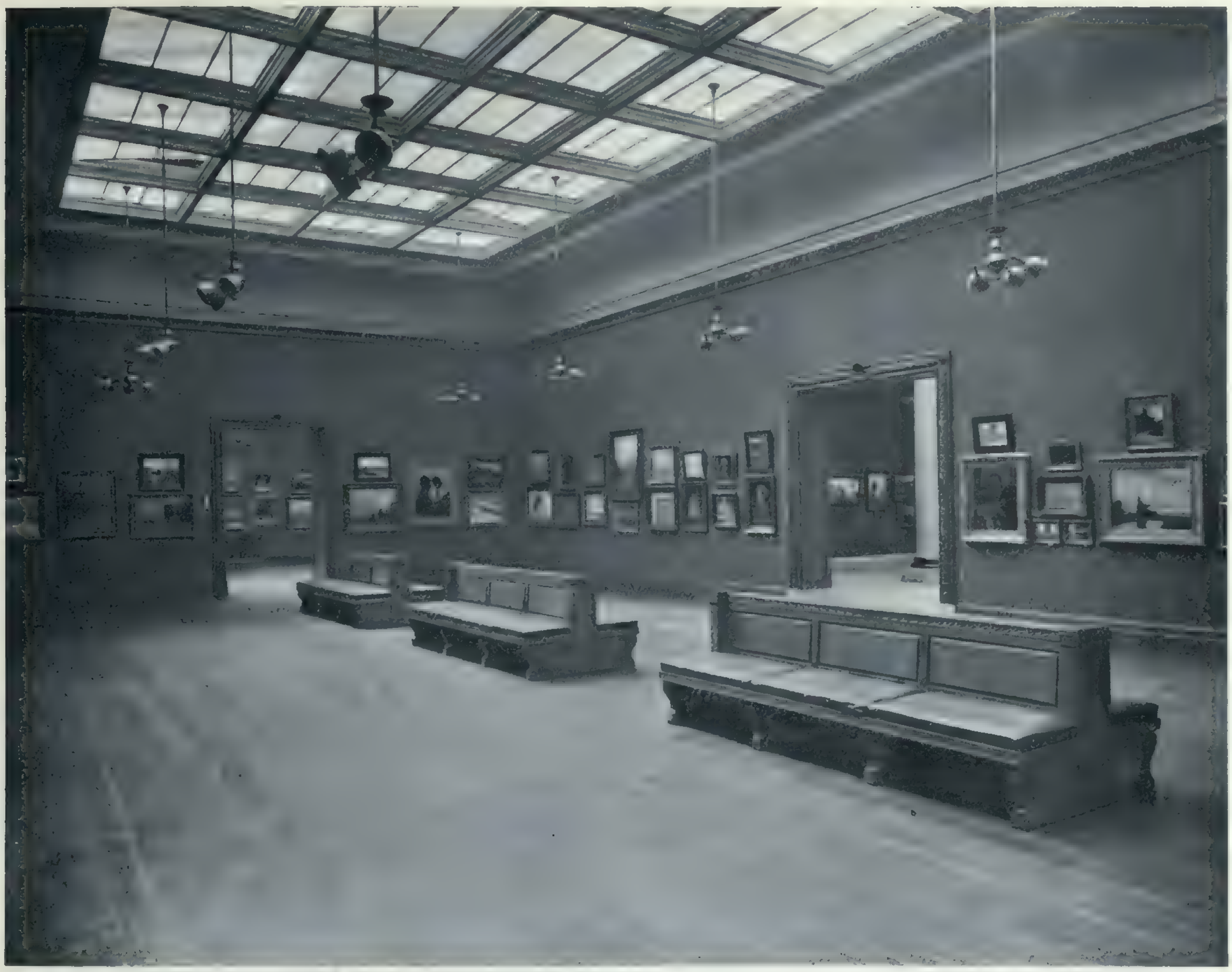
It is this feeling that stamps itself upon the mind, even of a layman; a feeling that leaves a sense of satisfaction and completeness of what should prove to be an enduring and lasting monument for centuries to come.

In referring to the new Art Gallery, the "Canadian Real Estate News" recalls the history of the founding and growth of the Association during the last fifty years.

As early as 1849 a few of the citizens and artists banded together and began the struggle to foster a feeling for art and beautiful things, and from that time onward small groups of public spirited men devoted their time and drew largely upon their resources towards continuing the movement then begun. Naturally, as in the beginning of any movement, they encountered many difficulties and want of interest, but their efforts from year to year bore fruit, and finally in 1860 the Art Association of Montreal was duly incorporated, and some of the members of the present Council were members of the Association at that time, and aided it as generously as they still are doing.

The first President of the Association was the Right Reverend Bishop Fulford. The objects of the Association were stated to be the encouragement of art, the establishment of properly equipped schools, and the maintenance of the Association for these purposes.

The Association was empowered in the usual



MAIN GALLERY, FIRST FLOOR.

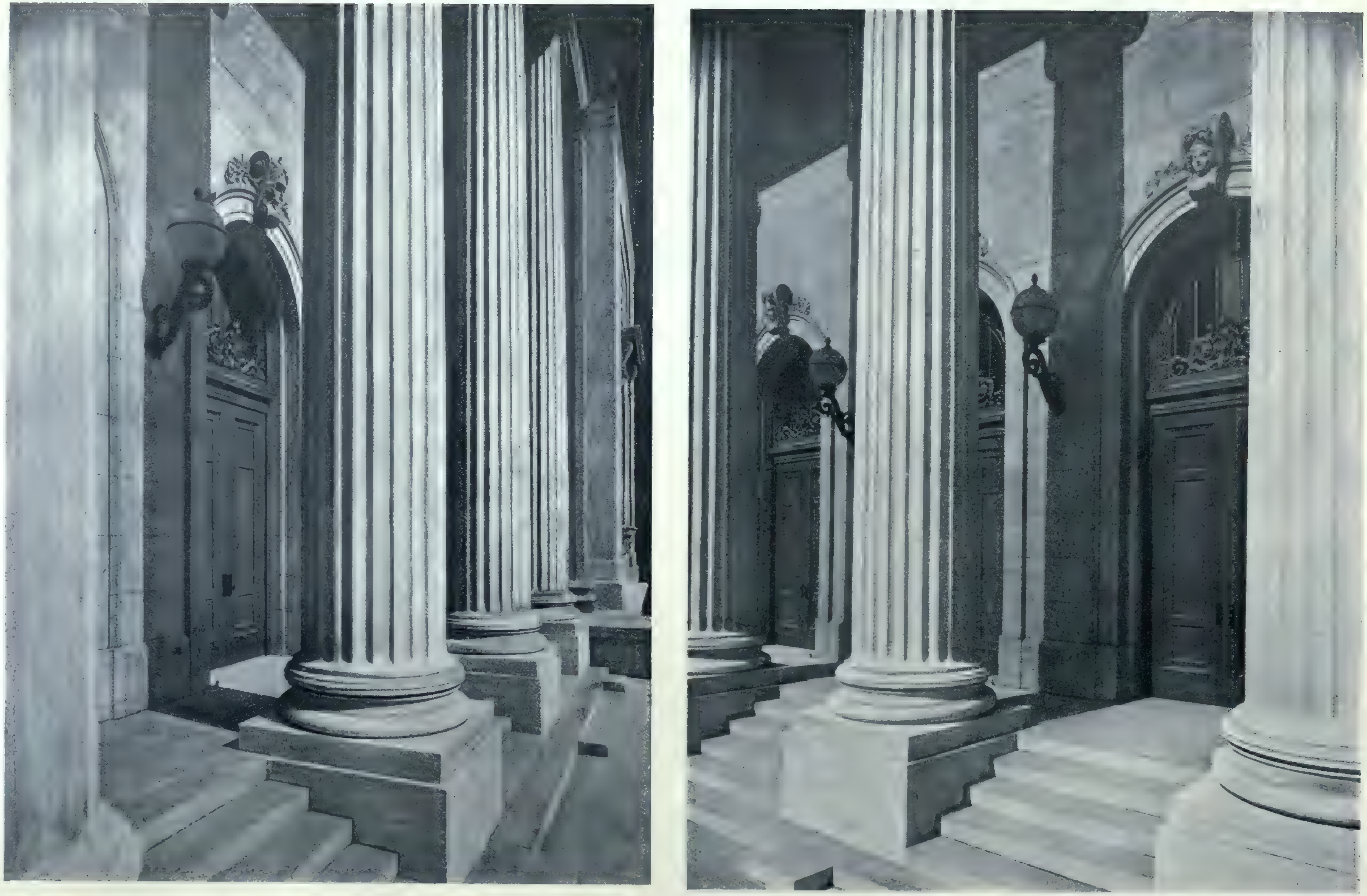
way to acquire and sell property, and the constitution and by-laws were drawn up defining the mode in which the business of the Association was to be carried on. Having so formulated their position, matters began to improve and interest in art became more widely spread, but the cost of maintaining the institution still had to be borne by a small number of citizens, among whom were still some of the earnest men through whose incentive the movement was first started. No municipal or government aid was given and no financial encouragement whatever was received by them, their only reward being that they were furthering the culture of their fellow-citizens, and filling thereby a great want in the life of the community.

Among these men was the founder of the present Art Association, Benaiah Gibb, Esq., who died on the 1st of June, 1877. His great services to the Association and to this city are summarized as follows on the bronze tablet in the hall of the gallery in Phillips Square:—"This Art Gallery owes its existence to the liberality of Benaiah Gibb, Esq., who died in this city on the 1st June, 1877. By his will he devised and bequeathed to the Art Association the land on which this building stands; $8,000 in money; over 90 oil paintings, and eight valuable bronzes. This Association has placed this tablet here in honor of the donor, and as a small token of respect and gratitude to him, and to aid in perpetuating the memory of his generosity and public spirit—1881."

This bequest gave a home to the Association and some important pictures with which to commence their collections. Upon receipt of this bequest the Council proceeded immediately to the erection of what is called the "Old Gallery" with rooms and shops below, and by aid of private subscriptions and this bequest were enabled to complete the building, which was opened on the 26th May, 1879, by the Marquis of Lorne, then Governor-General, and Her Royal Highness Princess Louise.

In his opening address His Excellency worded the ideals of the Council in respect of the need in a young country like ours where the pursuit of material things is so strenuous of a movement stimulating the love of art and beautiful things.

He said in part:—"We not only believe that the love of the beautiful in nature and art is a



DETAILS, FRONT ENTRANCE PORTICO.

THE NEW ART GALLERY, MONTREAL.

EDWARD & W. S. MAXWELL, ARCHITECTS.

source of some of the purest pleasures of life, but that it stimulates and supports our highest aspirations, and we think that the influence of the fine arts is specially important in refining and ennobling those practical aims which necessarily tend to absorb the energies of a people actively engaged in developing the material resources of our young and rapidly growing country."

The year 1893 saw the completion of an addition to the Old Gallery, containing a fine picture gallery, commodious rooms for the Antique and Life Classes, and a library and reading room built entirely by private subscription. This portion of the building in Phillips Square was formally opened on the 29th November, 1893, by His Excellency the Earl of Aberdeen, who in his address emphasized the need of such an organization as the Art Association, and referred gratefully to the services of the public spirited citizens, to whose efforts the erection of the building was due; and he also called attention to the need of such an organization as the Association—especially in a country like this where the demands upon the energy and enterprise of the people make it difficult for them to find time for the development of other departments of national life—and he concluded by expressing his hope for the growth of a Canadian School of Art, of which germs were already seen.

The completion of this building gave a new impetus to the Art School which was then in charge of William Brymner, R. C. A., now President of the Royal Canadian Academy. From that time on the attendance in the schools increased, and it annually instructs a large number of students in the most modern principles of art in oil painting, drawing, from life and cast, and in modelling.

In 1892 John W. Tempest, Esq., gave a large and valuable collection of paintings, and a considerable bequest of money for the purpose of purchasing paintings. Later in 1909 a magnificent collection was received from the executors of the late William, John and Agnes Learmont—which entirely fills the new Gallery, and contains many most important paintings.

In short, the transactions of the Association during the past half century form a remarkable record of unceasing effort and generosity upon the part of small groups of men, many of whom are still generous friends who devoted themselves to the furtherance of its objects. The result of the untiring energy and practical aid of these men is that the Association has been raised from modest beginnings to its present position, with a membership of nearly 1,000; with collections of paintings which compare favorably with those of most institutions of its kind. The Art Gallery building, of such imposing proportions, and so well constructed and equipped, is the pride of those who are entitled to the privileges of the Association, and a lasting monument to those who may have contributed towards its erection.

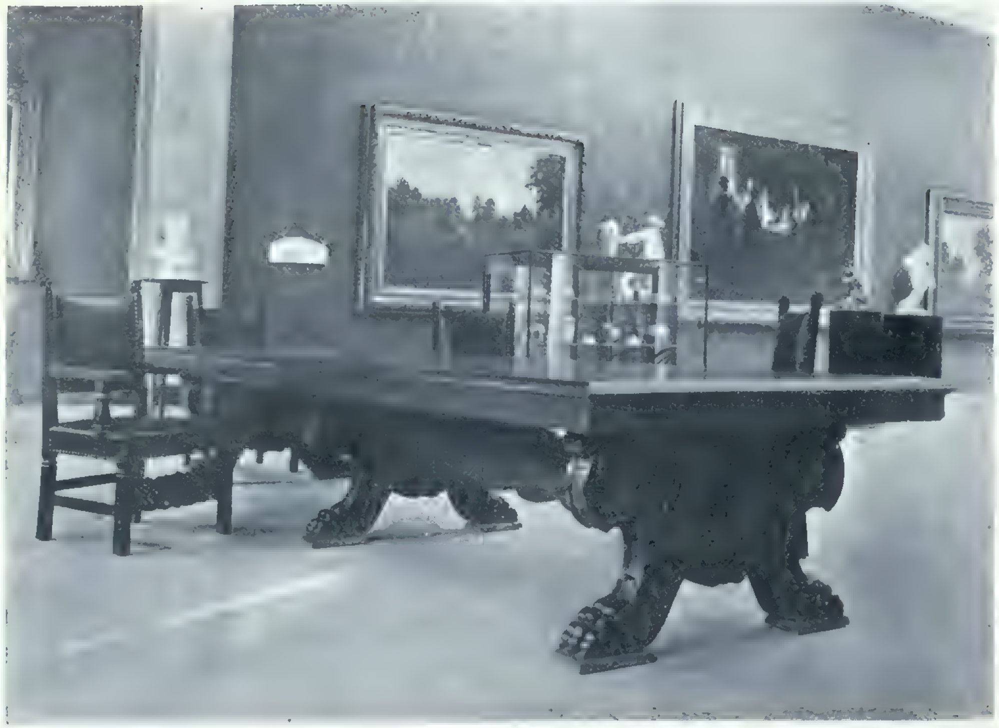
The interior of the building provides accommodation for the existing collections of pictures, objects of art, etc., and for future expansion. The exterior of the building is of white marble from the Dorset Quarries in Vermont. In no case have the practical features, such as windows, doors, etc., been sacrificed to obtain an effect which did not correspond with the interior requirements. The style may, therefore, be called "Classic" adapted to fit the complicated requirements of a modern building.

The Sherbrooke street front has a recessed portico approach by a broad flight of granite steps. The monolithic columns are of the Ionic order and are said to be the largest shafts quarried so far in this material in America, the length from base to capital being slightly over 31 feet. The flanking pavilions express galleries on the inside, the ground floor ones being lighted by large windows set six feet from the floor, the lintels being close to the ceiling. The proportions and the placing of all windows, it may be added, are based upon a series of experiments carried out in Boston, the details of mouldings and carving being particular to this building.

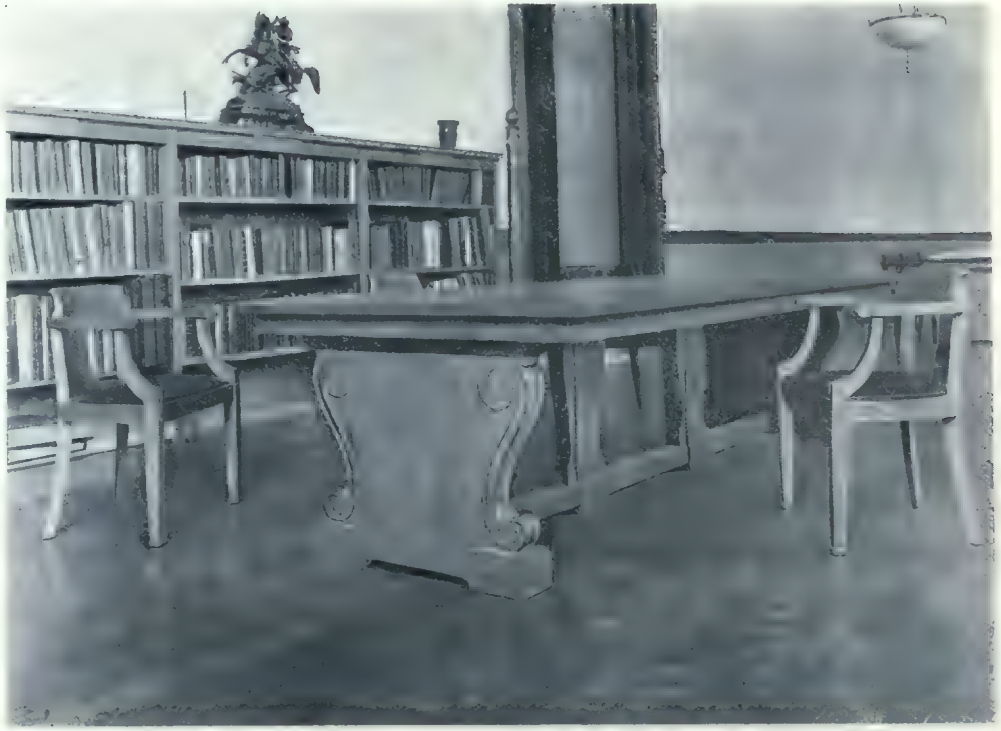
The main entrance to the building is through the three arched portals into small vestibules and thence into the large vaulted entrance hall, which is sixty-two feet by twenty-four feet six inches. The walls of this hall are of Botticino marble from Italy, the vaulted ceiling being of plaster. Continuing across this hall one comes to a broad flight of marble steps with ample landings leading direct to the first floor, at either side of the staircase are vaulted passages leading to the large transverse exhibition hall beyond which is a large top lighted gallery which will be used for lectures and exhibitions. Returning to the entrance hall one finds to the right a large room, 31 ft. by 62 ft., which will be used for a library. On the west of the building is a gallery of similar size, which will receive case objects. Ample provision is provided at either side of the main staircase for a ladies' coat room and a men's coat room.

A separate entrance is provided on Ontario Avenue, entering through a vestibule into the Exhibition hall. Adjoining these entrances, is the council room and secretary's office, and on the opposite side a staircase leading to the first floor and thence to the Art School. The first floor is devoted almost together to the top lighted picture galleries.

Ascending the main staircase one arrives in a top lighted exhibition hall, 66 ft. by 29 ft. 6 ins.



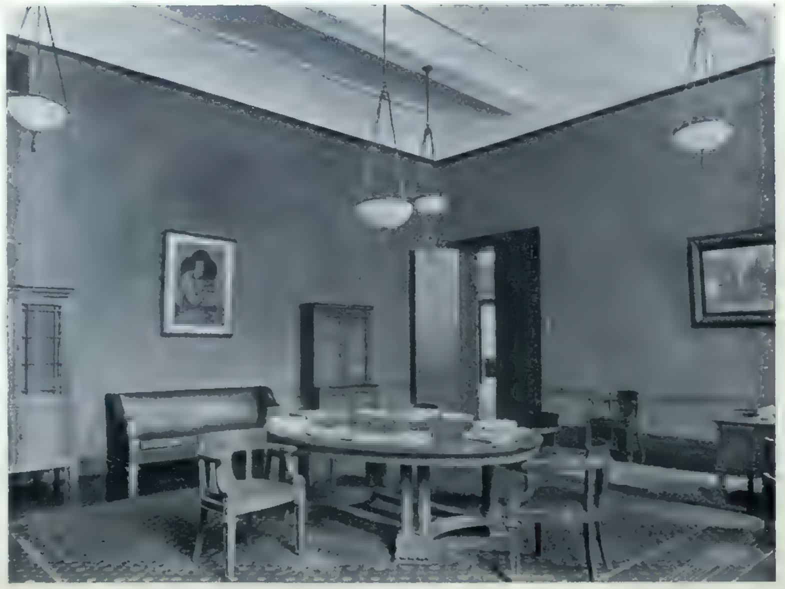
REST ROOM.



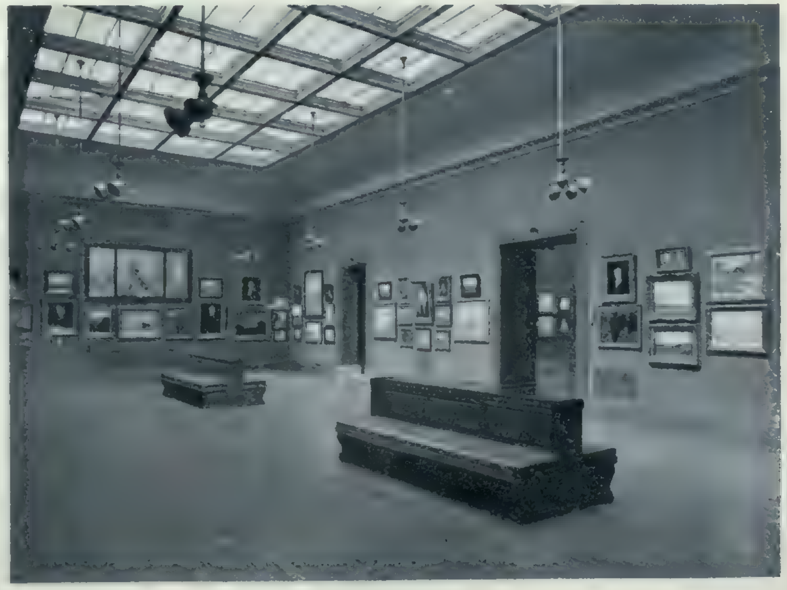
READING ROOM

THE NEW ART GALLERY,
MONTREAL.

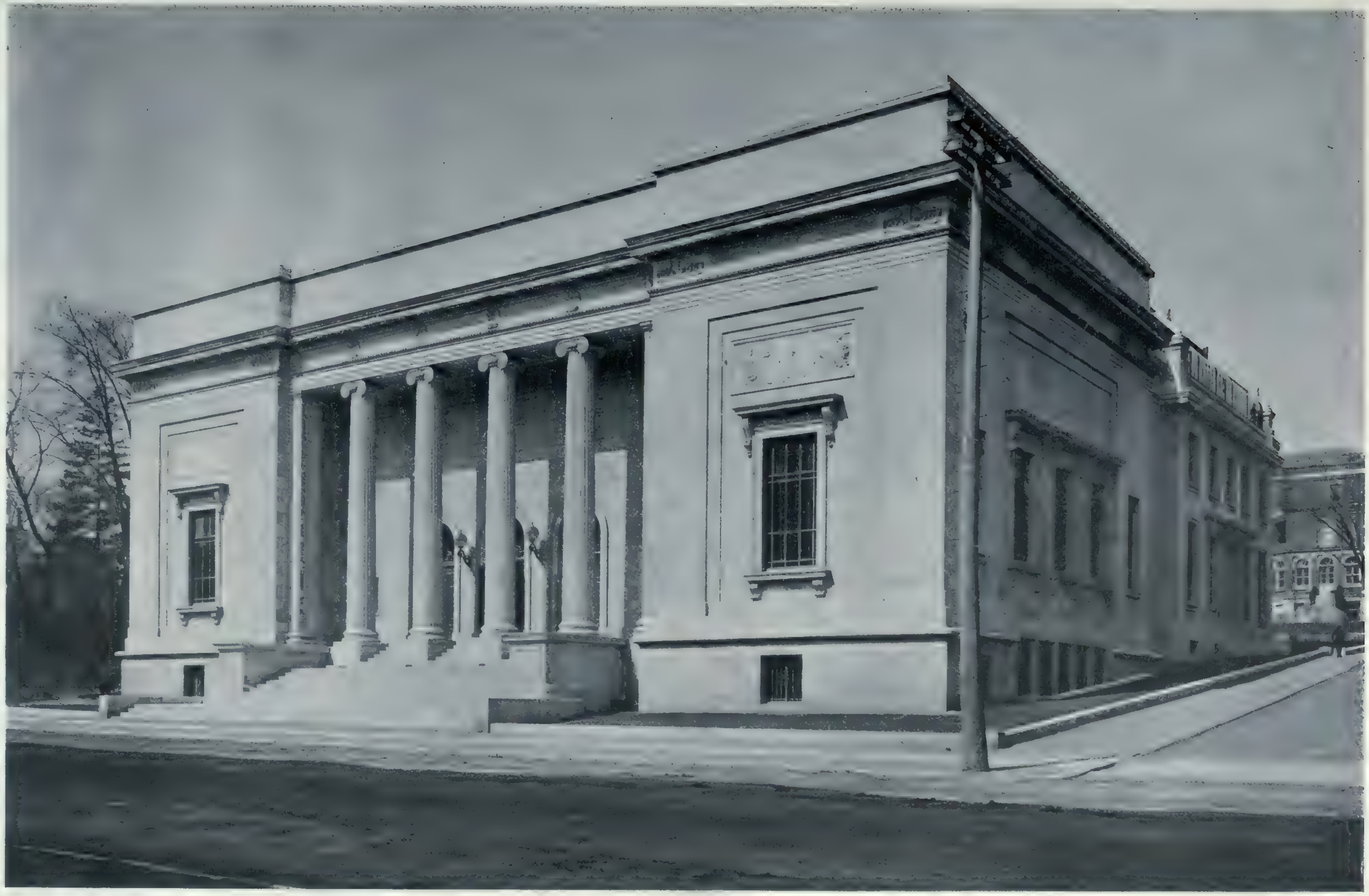
EDWARD & W. S. MAXWELL,
ARCHITECTS.



COUNCIL
ROOM.



EAST
GALLERY.



"Construction," 1914.

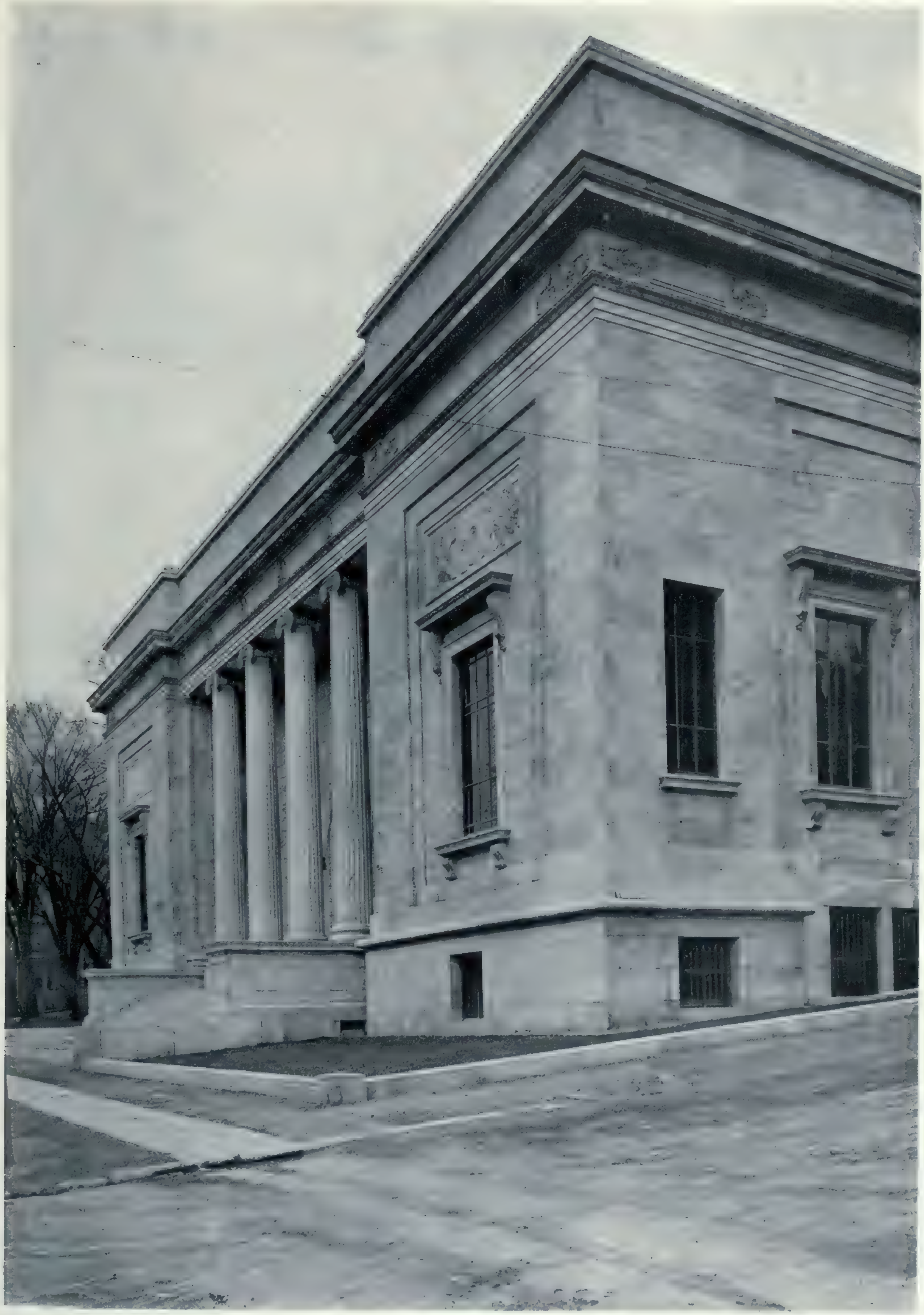
Plate I.

THE NEW ART GALLERY, MONTREAL.

EDWARD & W. S. MAXWELL, ARCHITECTS.

[illegible] I - XIII + [illegible]

14



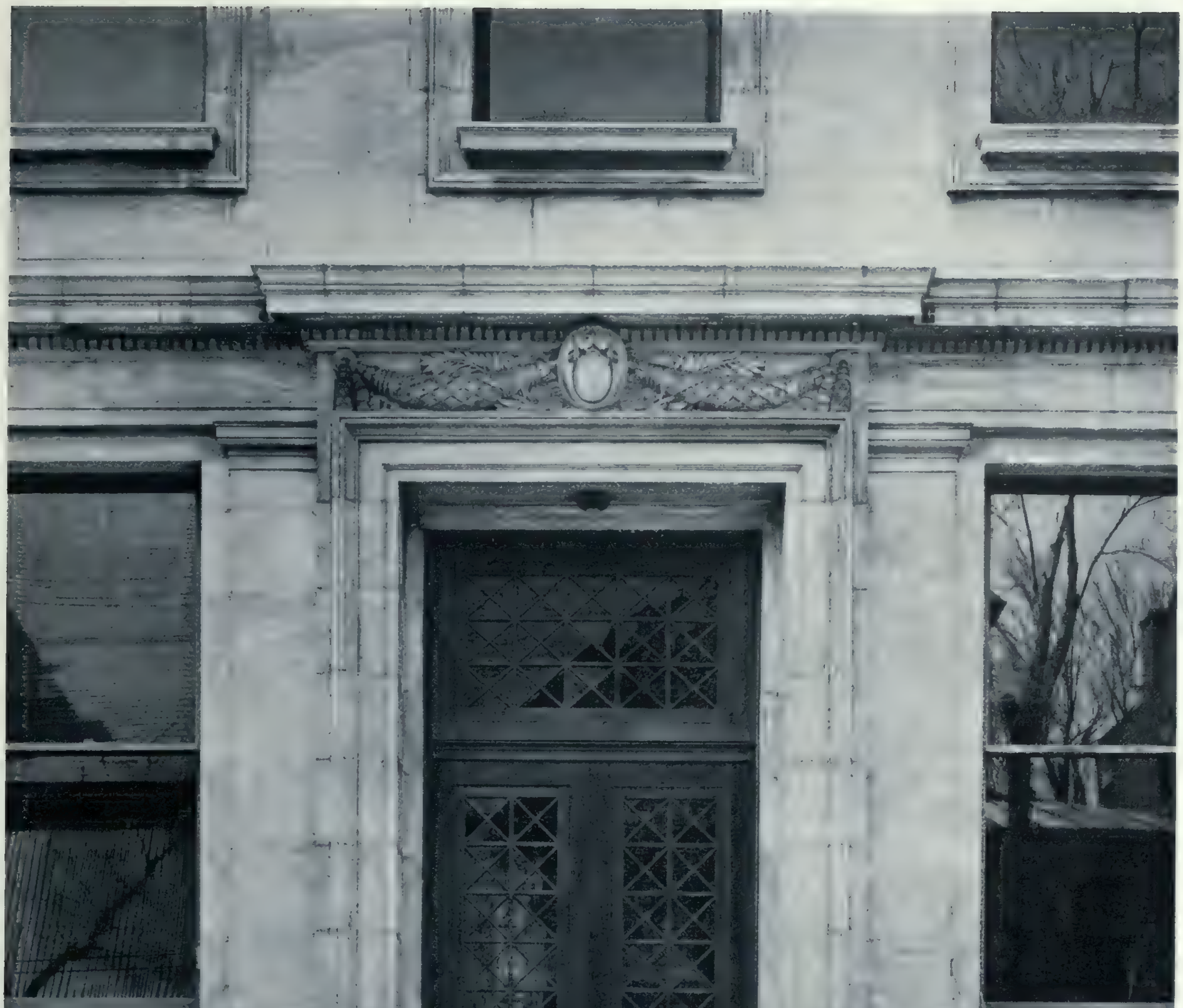
"Construction," 1914.

THE NEW ART GALLERY, MONTREAL.

EDWARD & W. S. MAXWELL, ARCHITECTS.

Plate II.

14



"Construction," 1914.

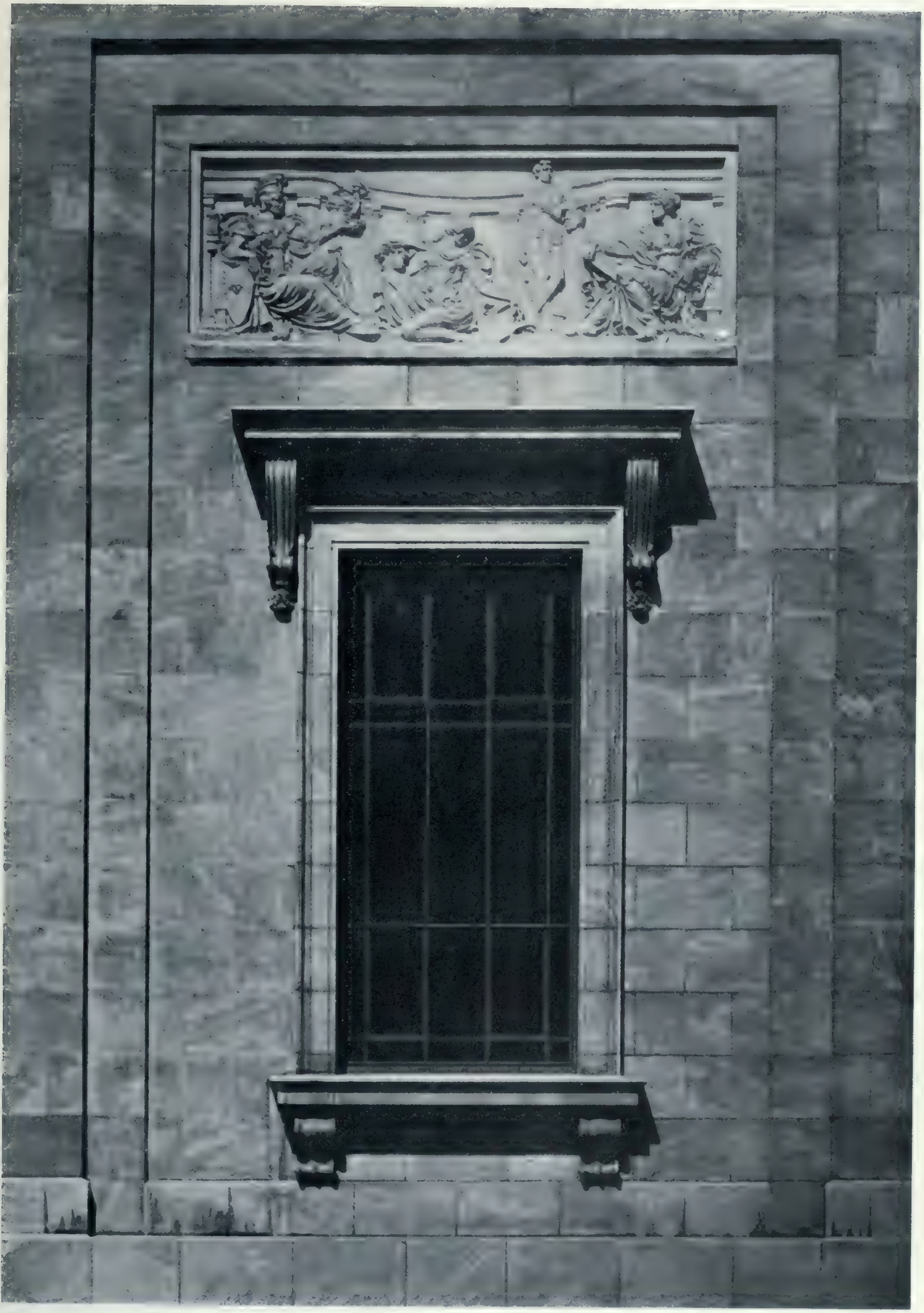
ENTRANCE, ONTARIO AVENUE.

Plate III.

THE NEW ART GALLERY, MONTREAL.

EDWARD & W. S. MAXWELL, ARCHITECTS.

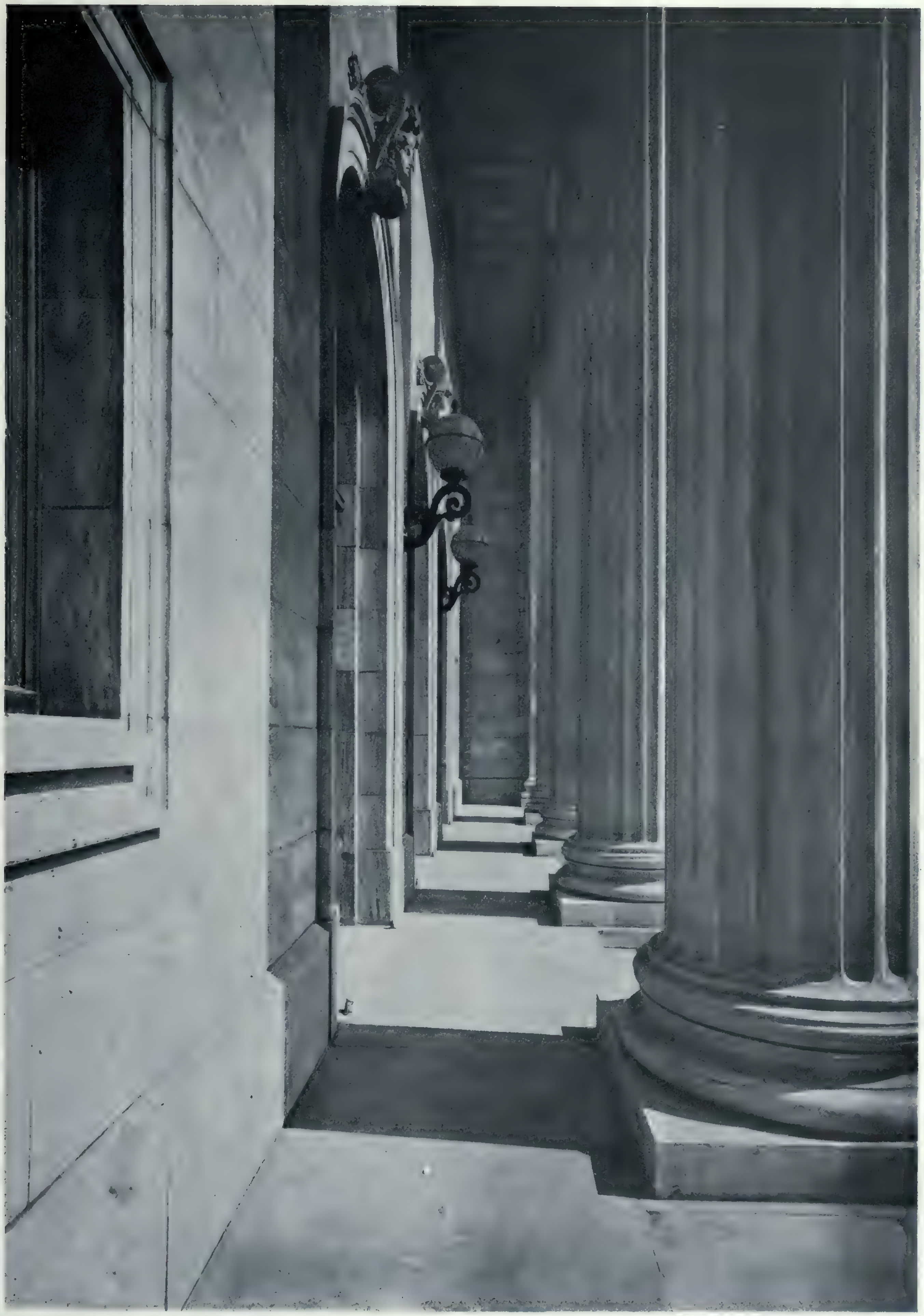
14



"Construction," 1914. WINDOW, SHERBROOKE STREET. Plate IV.

THE NEW ART GALLERY, MONTREAL.

EDWARD & W. S. MAXWELL, ARCHITECTS.



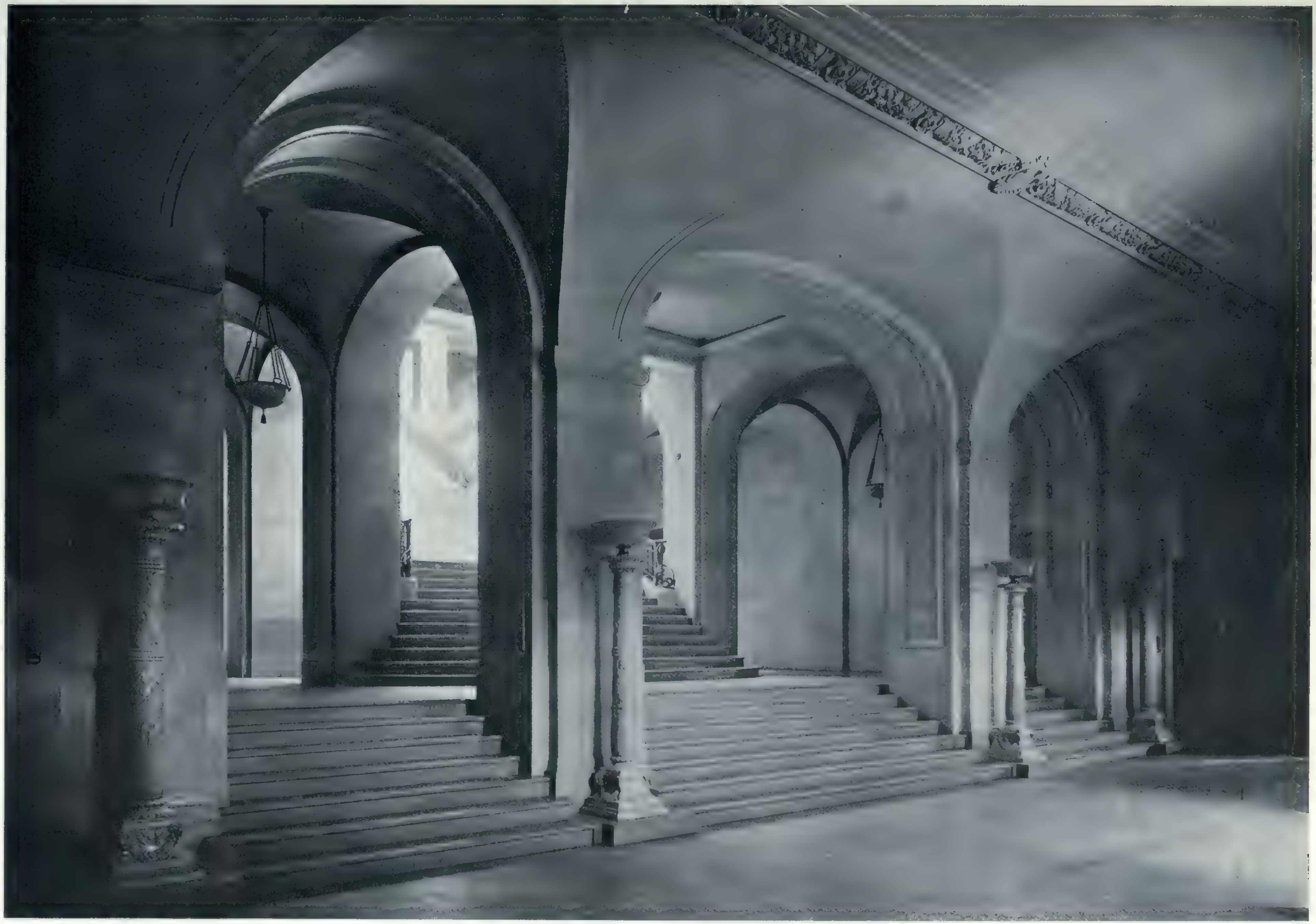
Construction," 1914.

PORTICO, SHERBROOKE STREET.

THE NEW ART GALLERY, MONTREAL.

EDWARD & W. S. MAXWELL, ARCHITECTS.

Plate V.



"Construction," 1914.

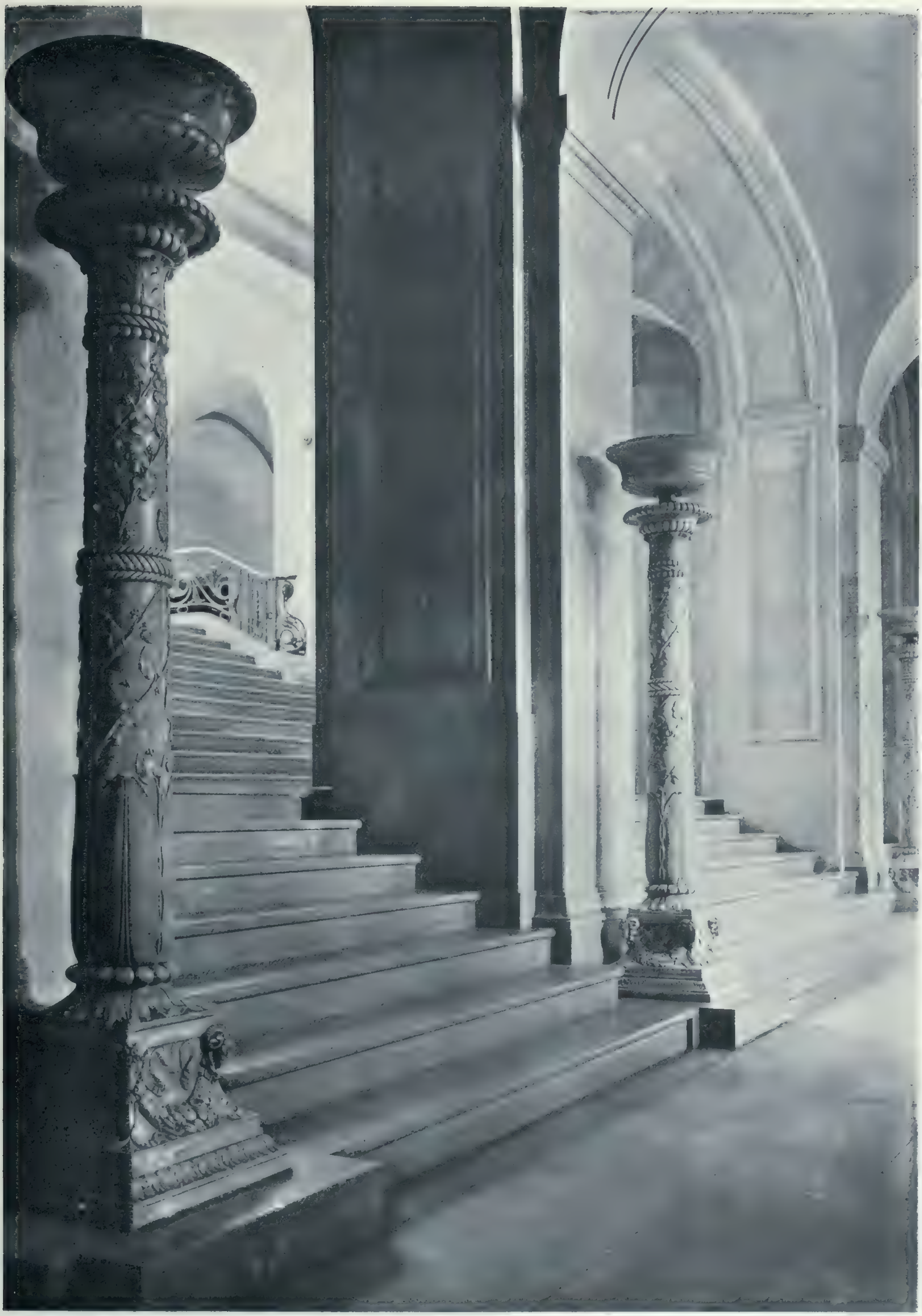
Plate VI.

MAIN ENTRANCE HALL, GROUND FLOOR.

THE NEW ART GALLERY, MONTREAL.

EDWARD & W. S. MAXWELL, ARCHITECTS.

14⁷

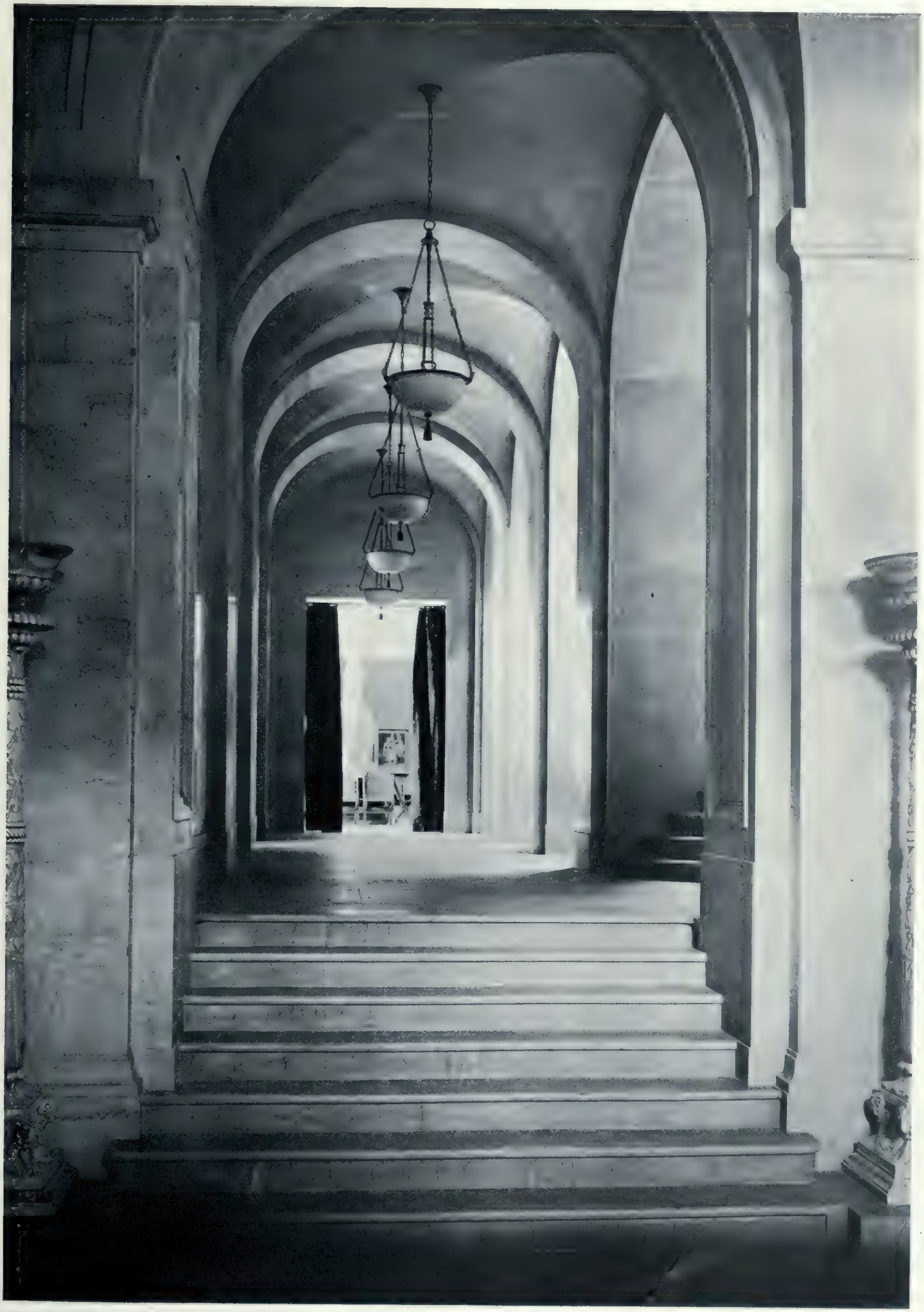


"Construction," 1914. STAIRWAY, GROUND FLOOR. Plate VII.

THE NEW ART GALLERY, MONTREAL.

EDWARD & W. S. MAXWELL, ARCHITECTS.

14



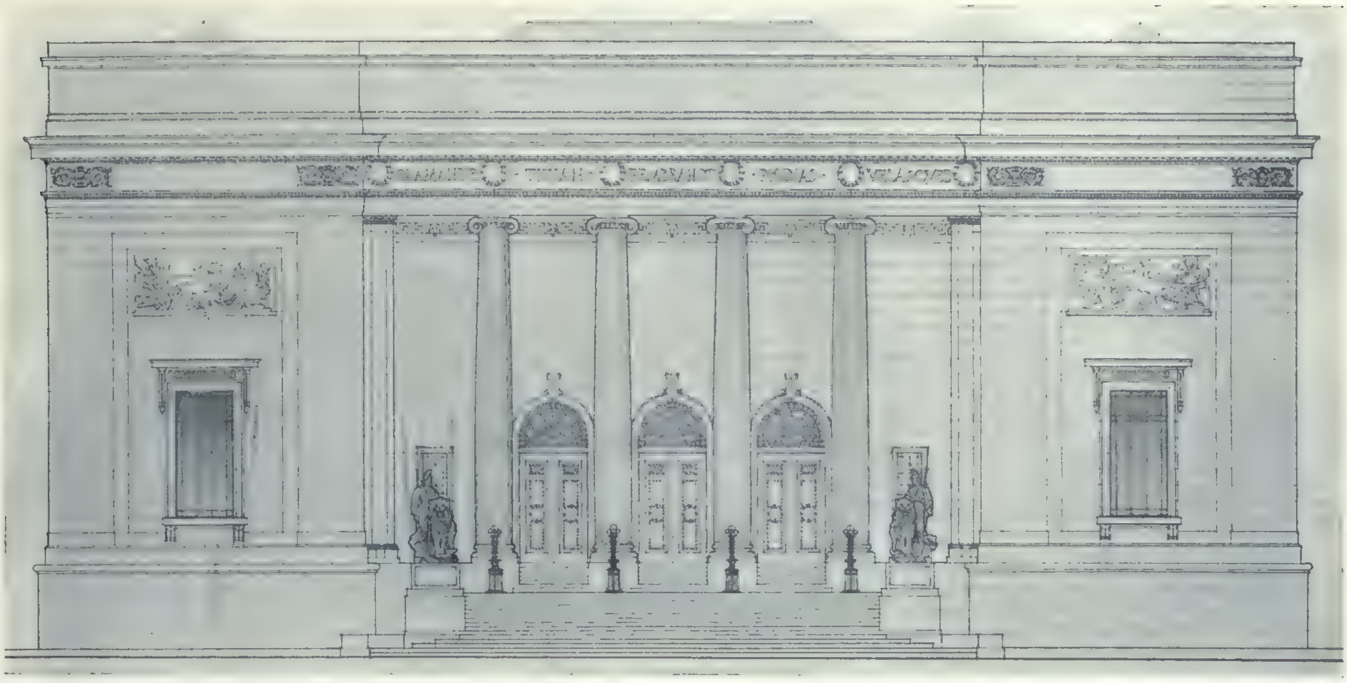
"Construction," 1914.

CORRIDOR, GROUND FLOOR.

Plate VIII.

THE NEW ART GALLERY, MONTREAL.

EDWARD & W. S. MAXWELL, ARCHITECTS.

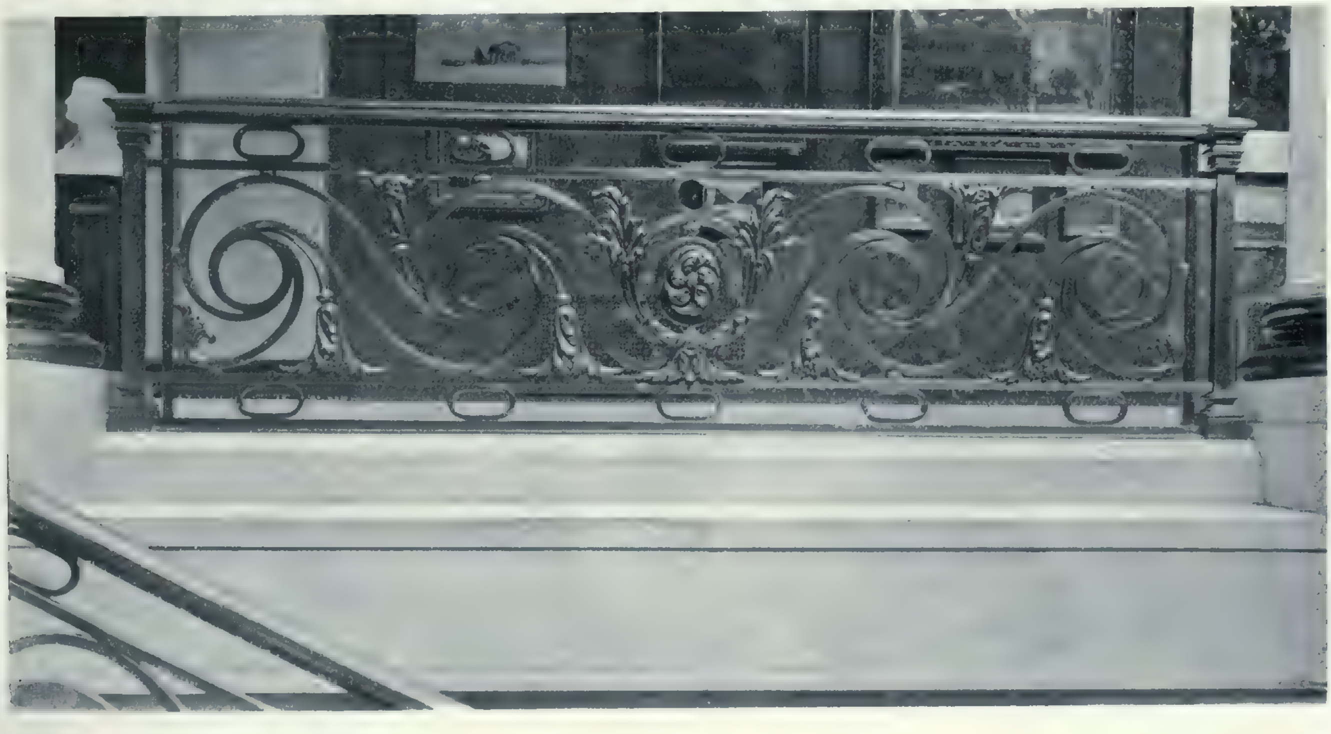


SHERBROOKE STREET ELEVATION.

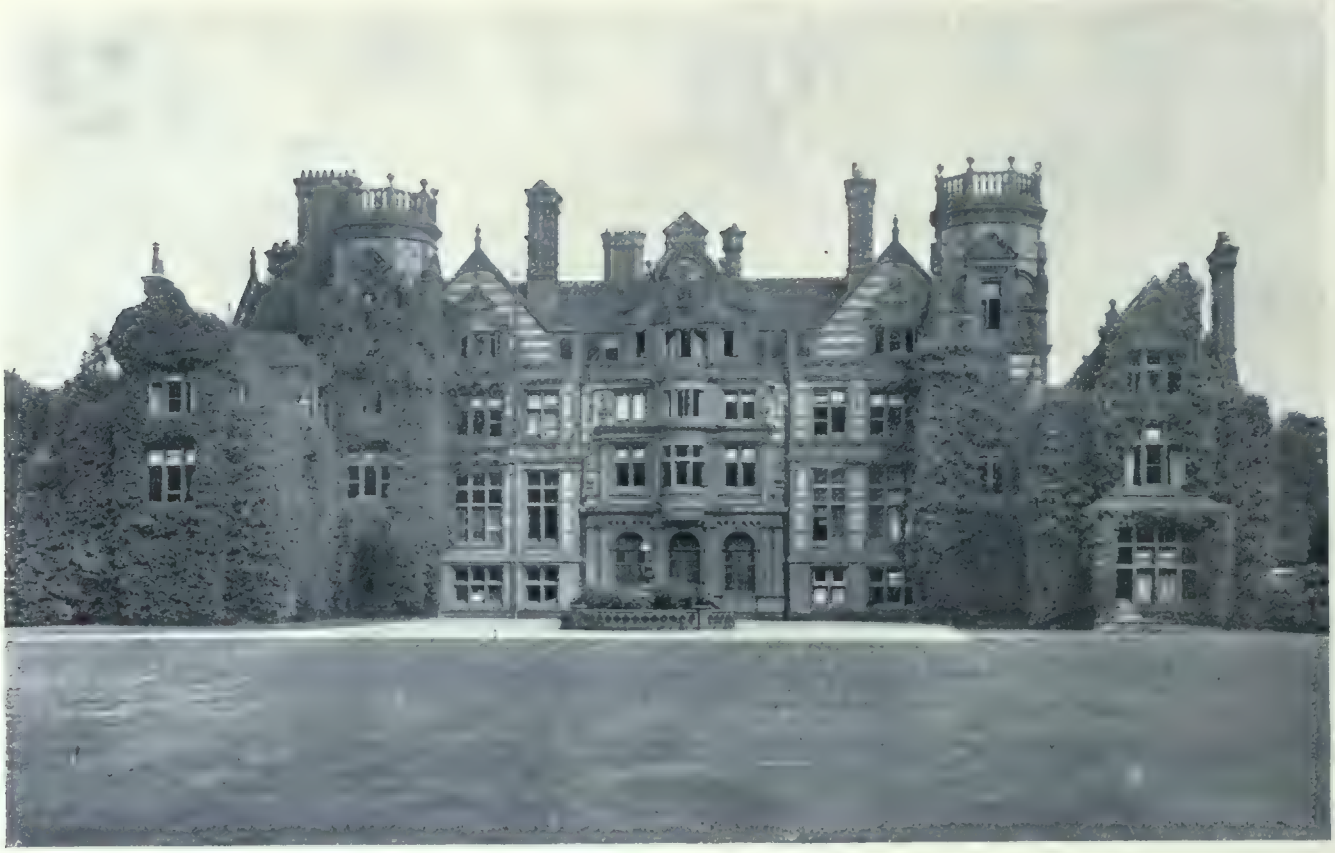
This hall breaks the circuit of the picture galleries. The main gallery facing Sherbrooke street, is reached by passing around the staircase well through exhibition passages 12 feet wide, having on the well side columns of Botticino marble with bronze caps and bases and a wrought bronze handrail, and on the opposite side plain walls for exhibition purposes. The main picture gallery is 63 ft. by 33 ft., top lighted.

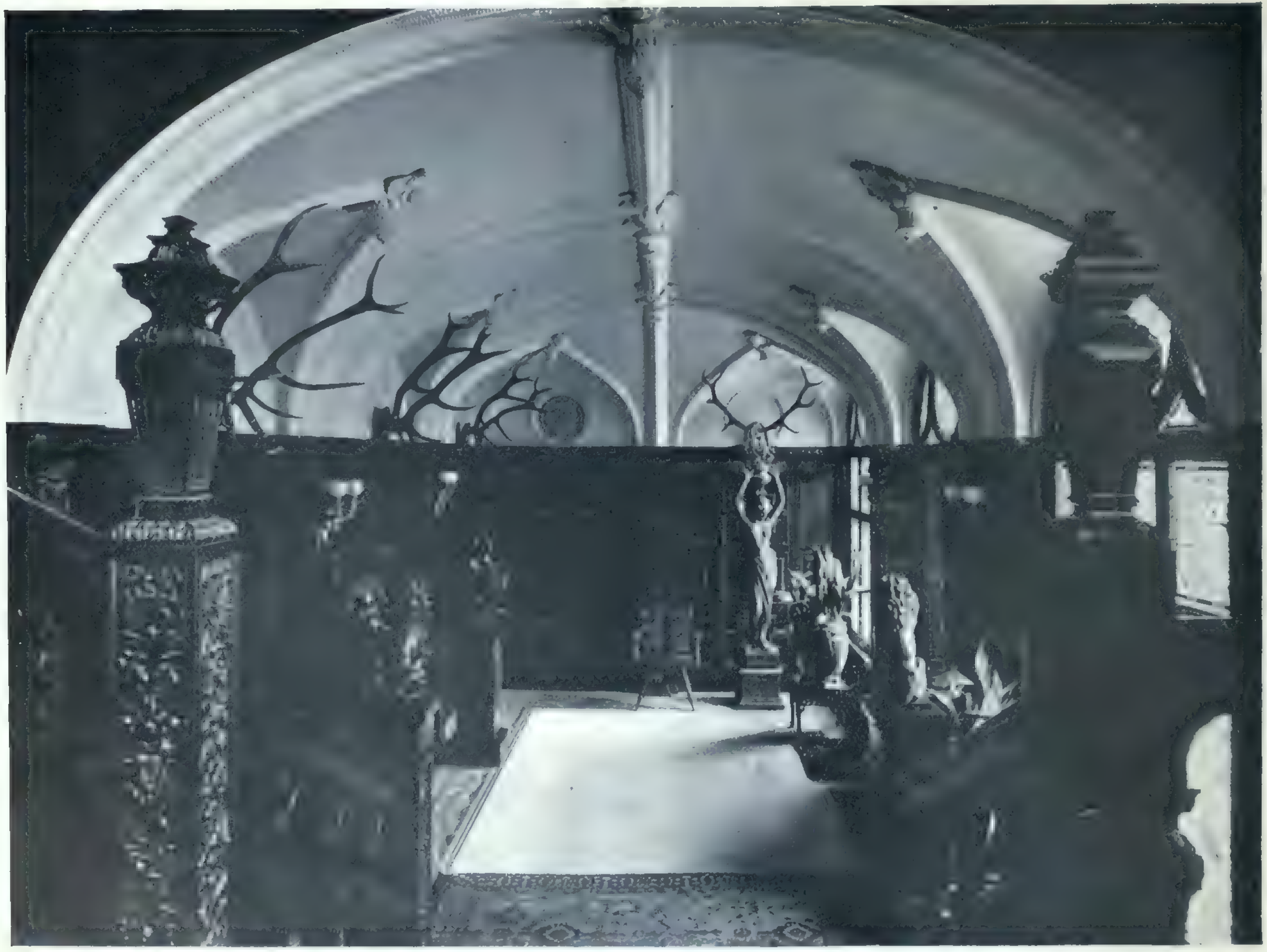
Adjoining and on the west is another picture gallery, 31 ft. by 60 ft. 6 ins., top lighted, and in a corresponding position to the east is a similar picture gallery. On Ontario avenue there are three side lighted galleries for the exhibition of special paintings, water colors, etc., the balance of the floor is taken up with storage spaces, elevators, etc.

The top floor contains the Art School facing Ontario Avenue. There are three large studios provided and the necessary accessori. The basement contains the modelling room for the Art School. Quarters for the caretaker, lavatories, ample storage spaces, and boiler room, etc. The general furnishings are of a simple dignity characteristic of the building itself.

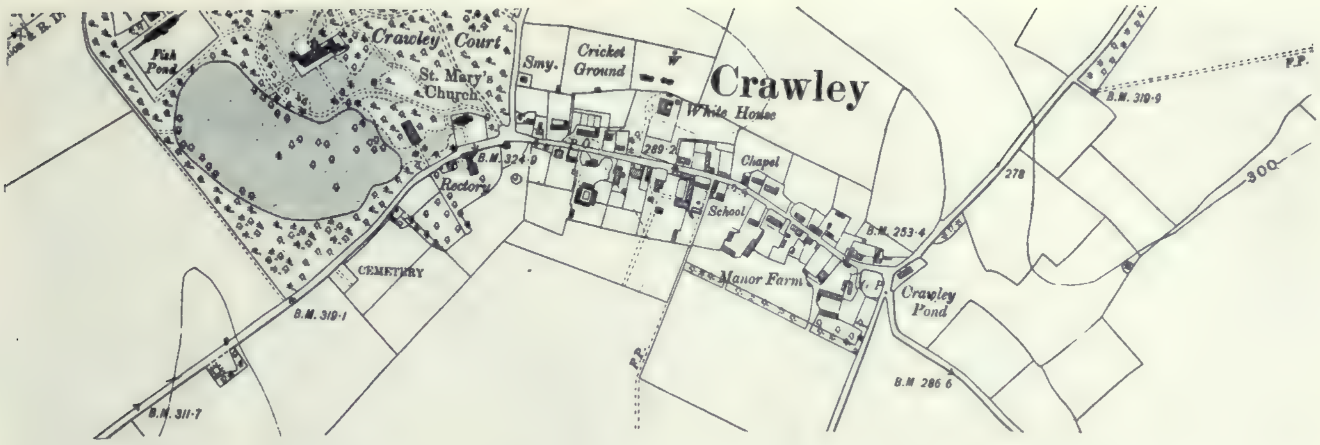


BRONZE STAIR RAILING.





MAIN FACADE. CRAWLEY COURT, HAMPSHIRE. ENG. UPPER HALL.



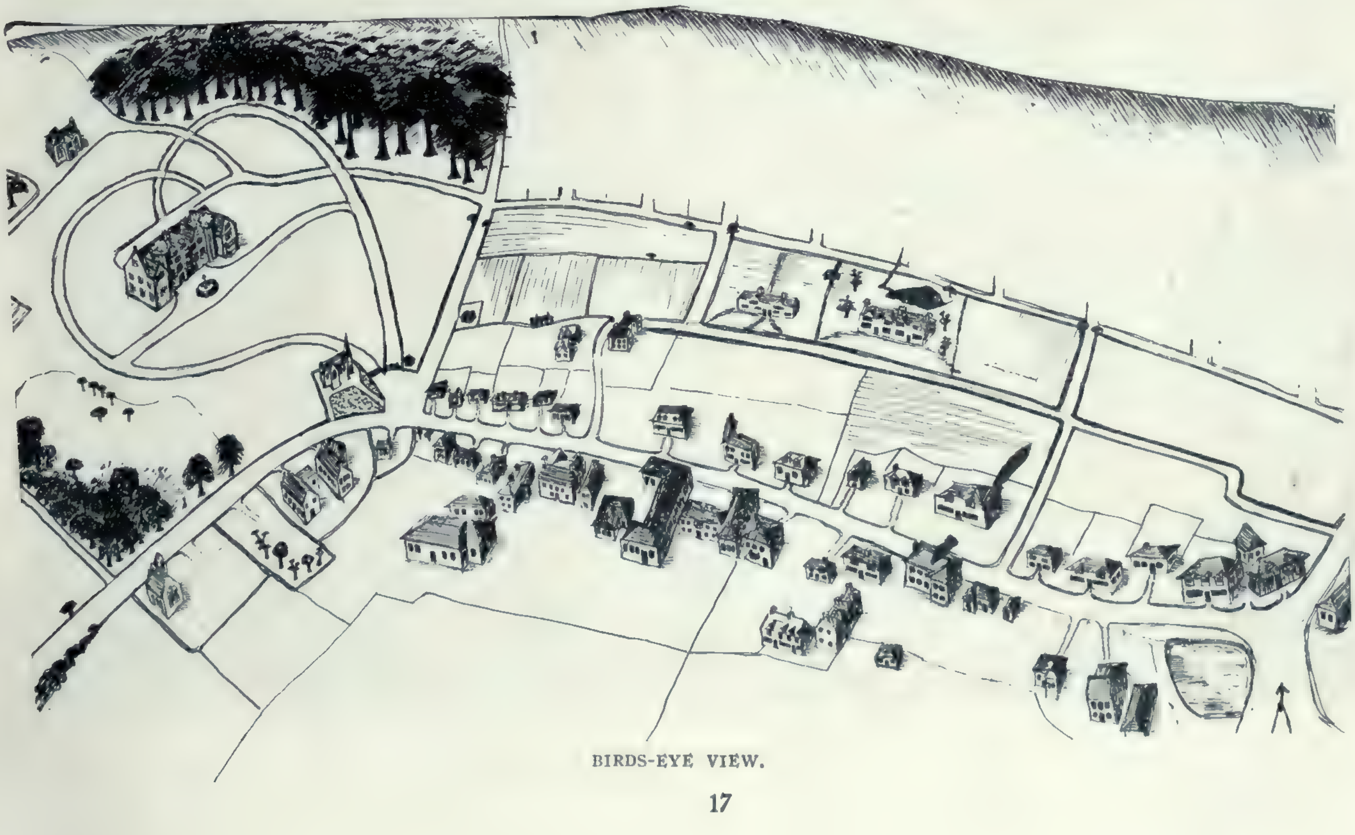
Crawley Court in Hampshire, England

John Y. Dunlop

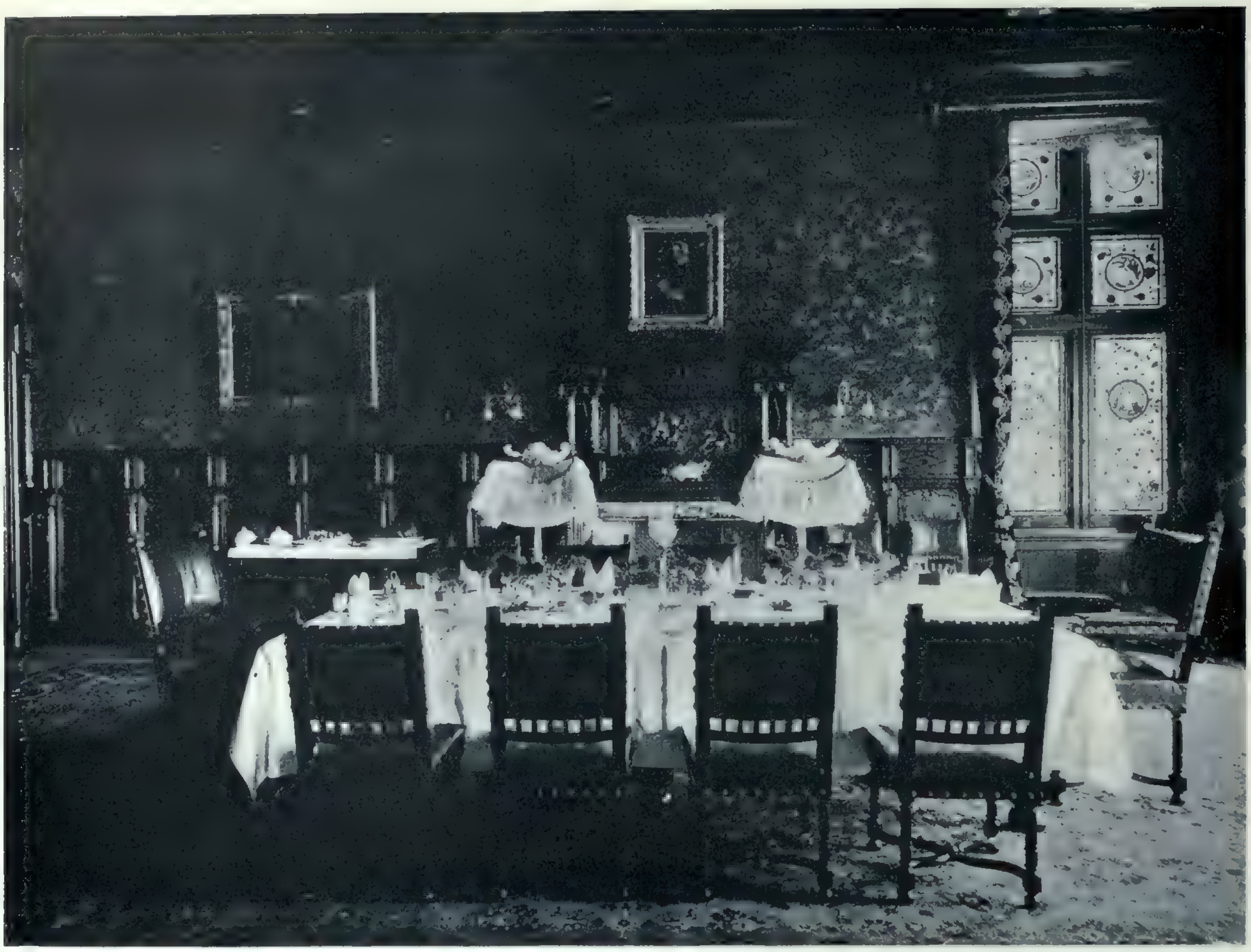
THE conditions of rural life in Hampshire throughout the various townships and tithings were very much under the control of the people in early times. In many districts the tenants, assembled in their annual court, appear for centuries to have elected their own lord of the manor who had in virtue of his office the right to certain claims and the privilege of hunting in forests all over the county.

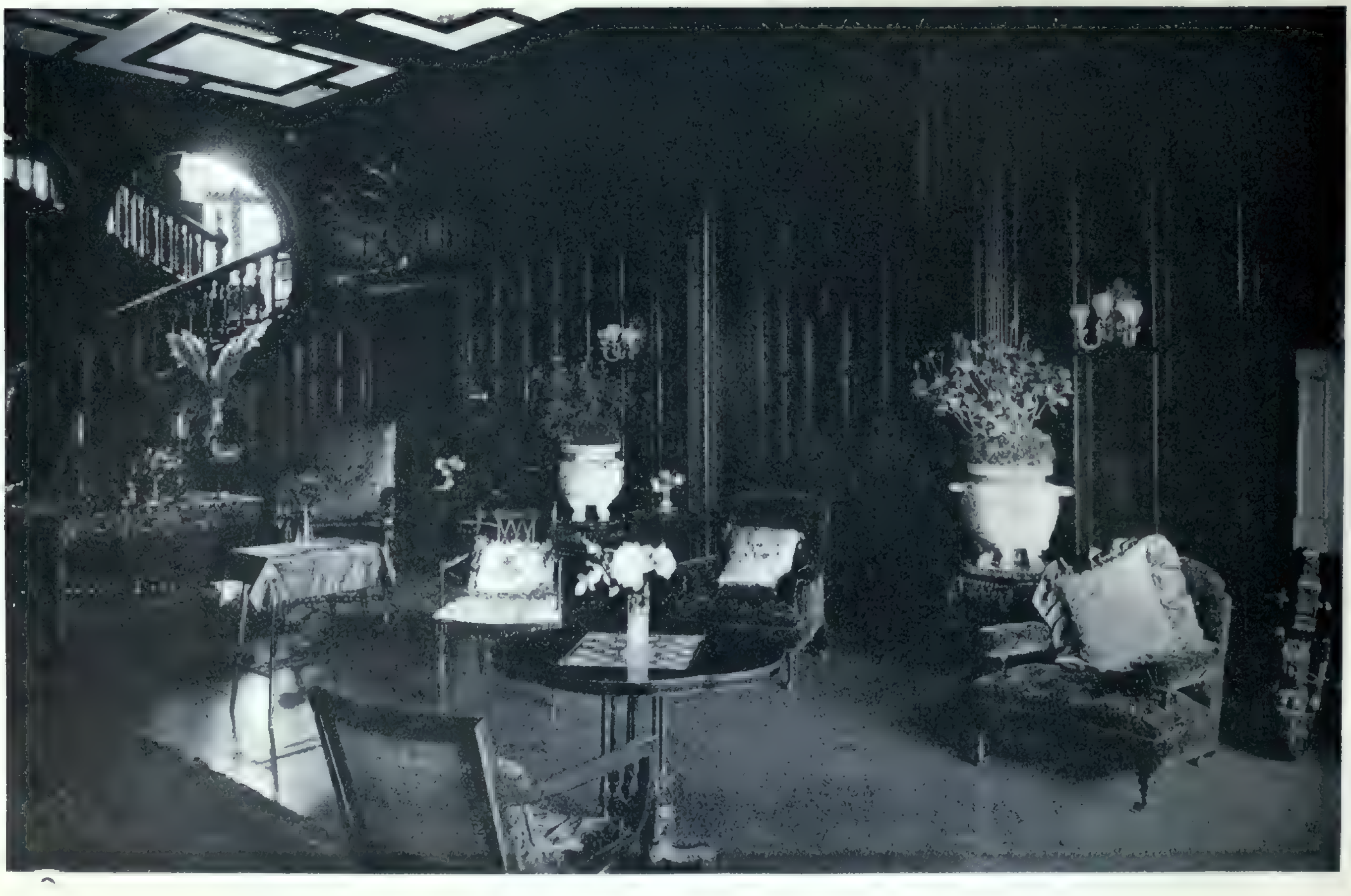
In the old Hampshire towns no courts are now held. Some of the manors acquired the right of holding markets and fairs at certain times and so became the centre where people went to sell their corn and live stock and buy other commodities in return. It was not until the beginning of the present century that some of the large villages possessed shops—the privilege being in all cases a market privilege, and if no authority existed for the market no shop could be opened.

Not until the eighteenth century did the Hampshire landscape begin to present the characteristics of enclosed meadows and fields, hedge rows and private woodlands. One effect of these inclosures was the marking off of the common land which belonged to the people and on which when sub-divided the people could build themselves cottages and homes. Thus it happened that most of the small towns arose where the common land was located. In many cases afterwards, the commoners appeared to have sold their portion to the lord of the manor for a money payment, and in such instances no new towns sprung up at a near distance from the ancient town which still remains the habitable site of these parishes.

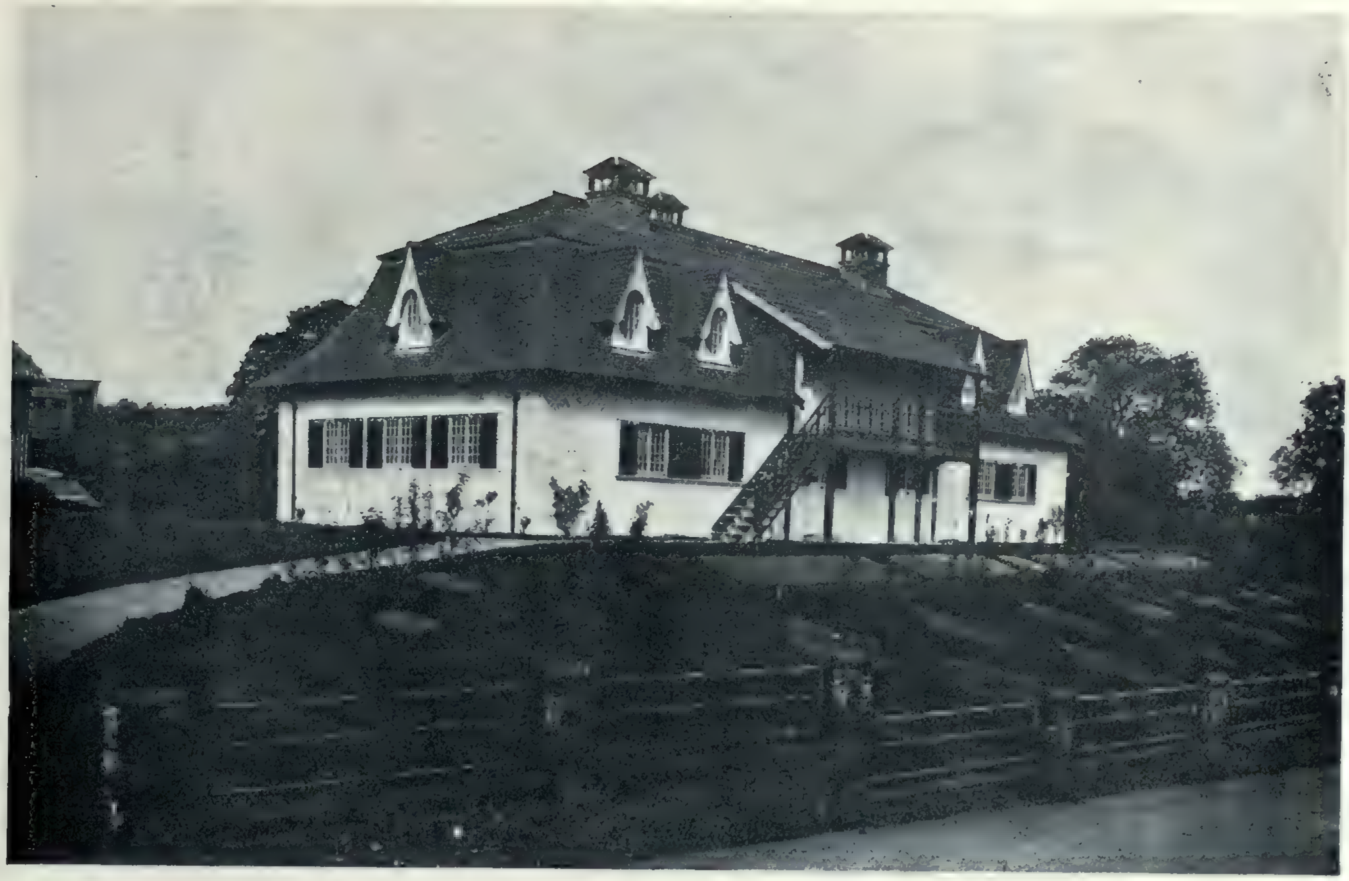


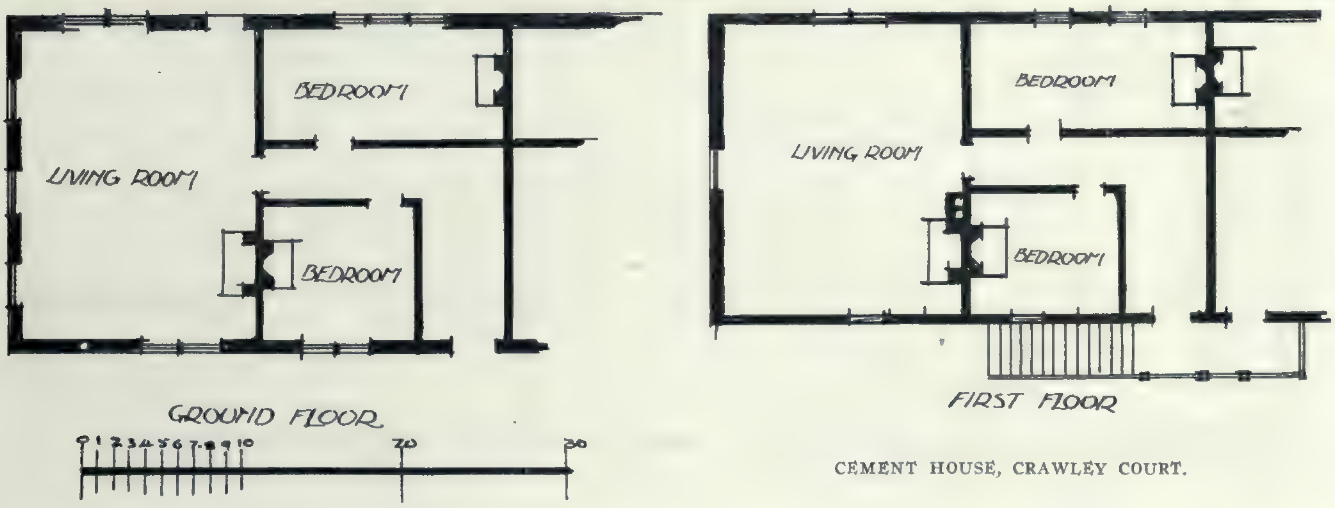
BIRDS-EYE VIEW.





DINING ROOM. CRAWLEY COURT, HAMPSHIRE, ENGLAND. LOWER HALL.





CEMENT HOUSE, CRAWLEY COURT.

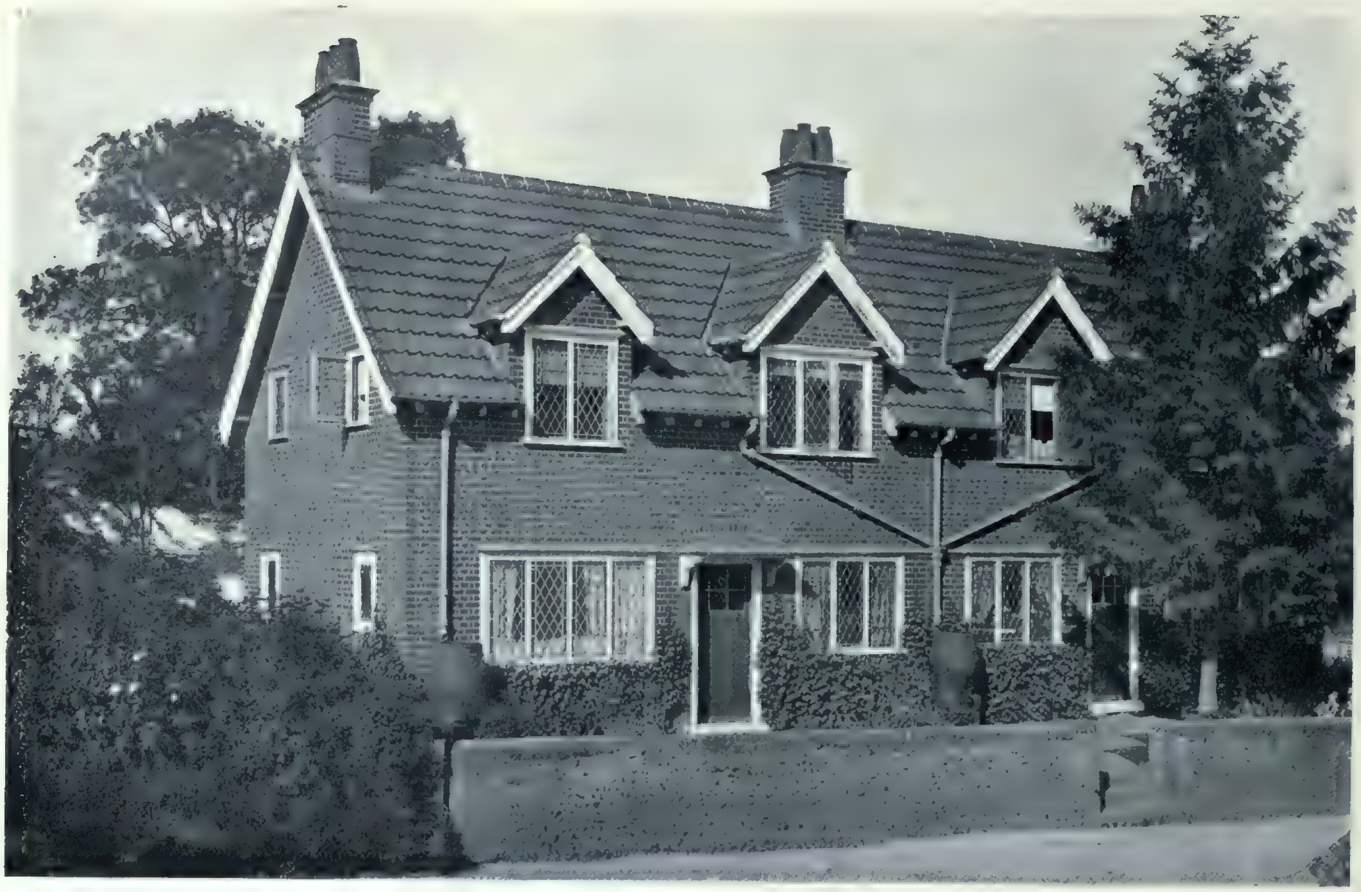
In those early manors such as Crawley Court, many fanciful designs showing extreme originality were erected. The general type was evolved from the quadrangular plan arranged round a large internal court yard after the lines of the fortified houses of the Middle Age. The later Elizabethan architects tended more and more to renounce this quadrangular plan by omitting the sides forming the entrance and thus producing a three sided court.

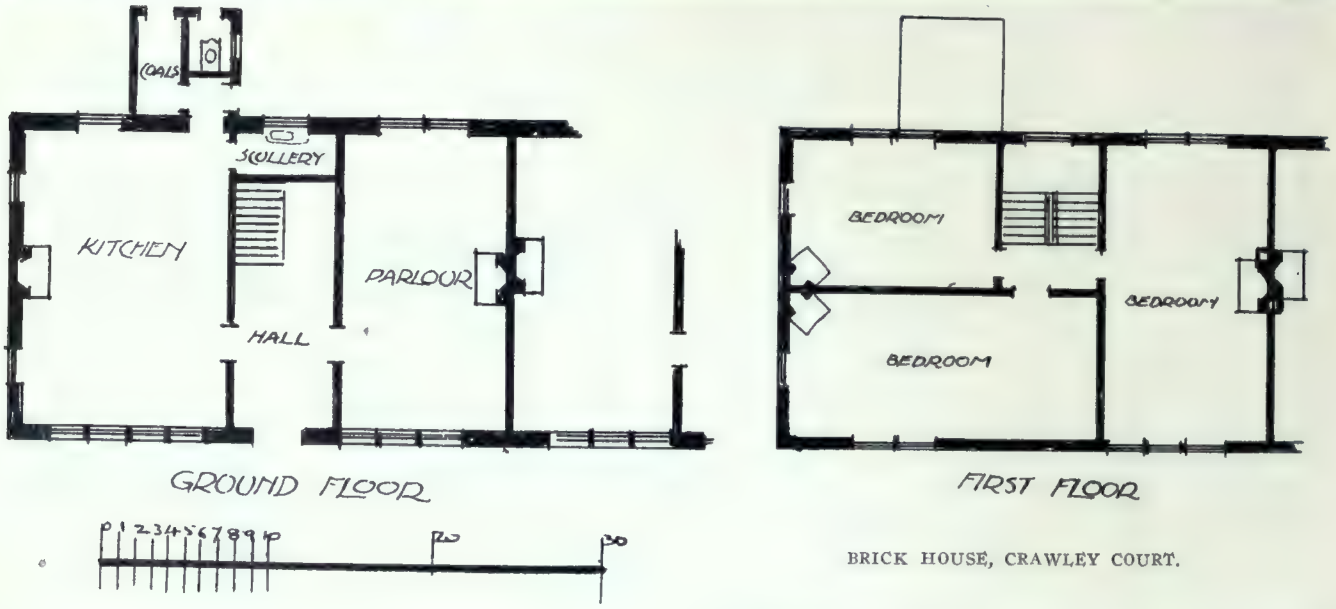
The H shaped plan of Crawley Court was evolved by extending the wings on both fronts so that we have a three-sided court on both the rear and the front.

The interior of the house is bright with ample space and very complete and massive in its furnishings. In the lower or great hall the oak panelling is 10 feet high above which is an oak frieze carved in relief. At one end is the oak screen forming the balustrade of the staircase, and at the other end is the raised dais with a tall bay window, the sill reaching nearly to the floor.

The hall fireplace is much elaborated and richly carved with the coat of arms of the owner while the timber ceiling is finished with plaster panels. The staircase in Crawley Court is a special feature with its heavy and richly carved newels and its moulded balustrade. In the upper hall the ceilings are on a vaulted principle with moulded ribs at the groins and main ridge.

In all the principal rooms the walls are panelled in wood and the ceilings richly modelled in wood and plaster. Many of the finishings of the rooms owe their excellence to the great delicacy and elegance of the mode in which the





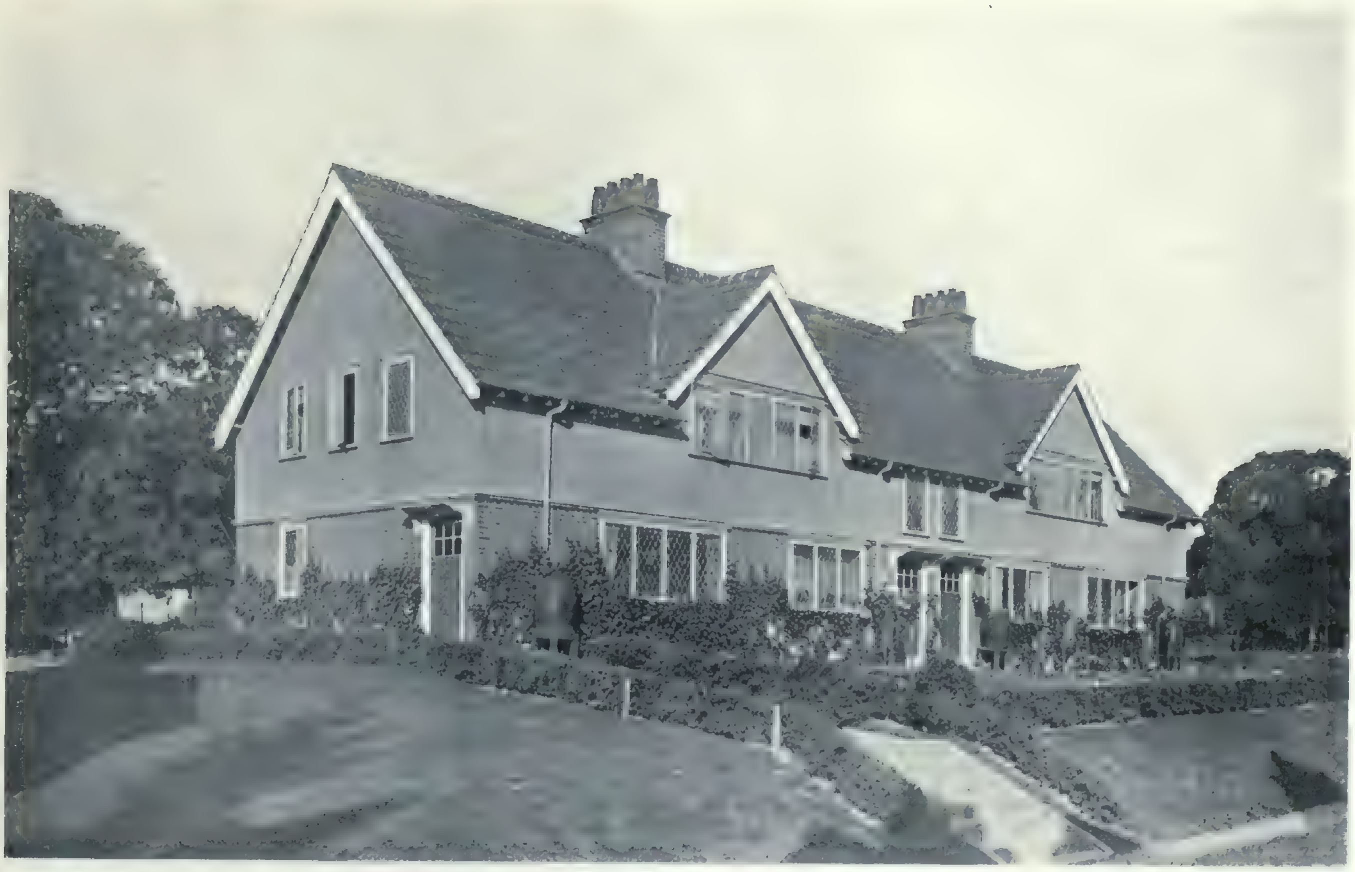
BRICK HOUSE, CRAWLEY COURT.

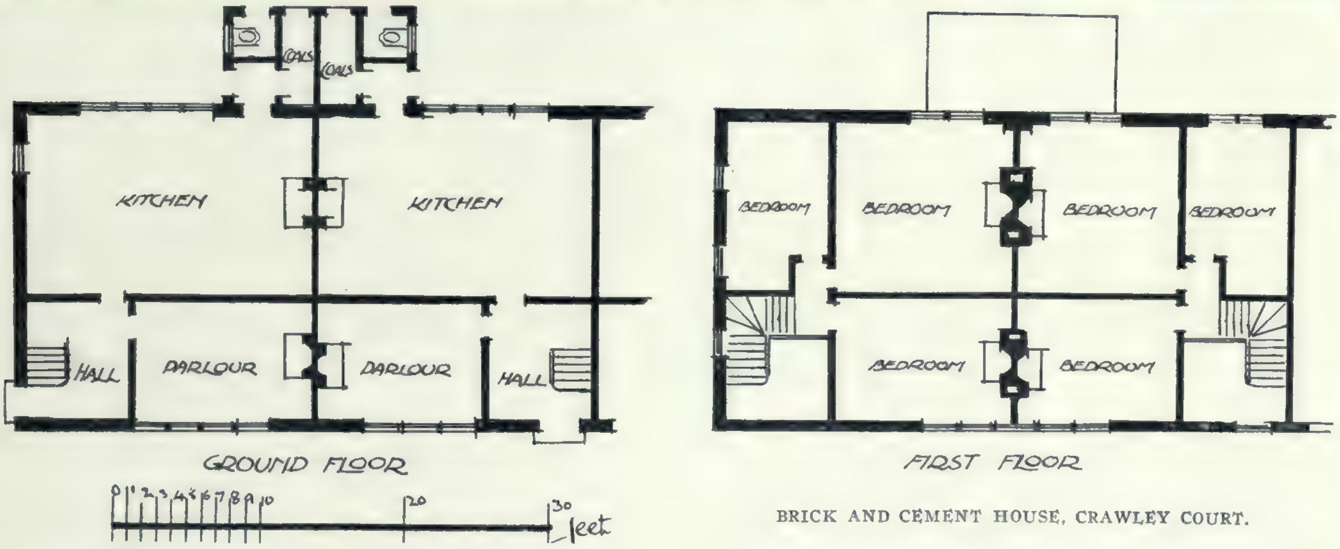
details have been carried out rather than to the vigor and boldness with which the masses have been shaped and disposed. Although grandeur is the noblest quality attributed to the Renaissance style, yet the architect of this house, with simplicity and elaboration has rarely failed to charm by the picturesque effect obtained.

In the houses of the people in Crawley, there are many factors which make home building in this town a matter for the architect's consideration. Each house presents a new problem which creates a demand and furnishes an opportunity for the individual character which is the first essential of artistic houses for the working class.

The present Lord of the Manor idea is that the design of the house is governed by the view of the surrounding country which one seeks to obtain from the principal rooms. For example, the desire to obtain the maximum amount of sunshine in the living rooms or the appearance of the trees that are to be retained in the garden. The material of which the house is to be built is also a consideration which is governed in a great measure by the building material that is traditional in the neighborhood.

The architect who builds in this district is not restrained by the convention which rules in many cities as to placing the best rooms in the front of the house. If the house faces the north he will probably place the principal living rooms





BRICK AND CEMENT HOUSE, CRAWLEY COURT.

at the back so that he may get as much sunshine as possible.

There is no reason why the back elevation should not be the main elevation. The kitchen and offices may face the road way, from which they will doubtlessly be separated by the garden ground.

The style of building shown in the accompanying illustrations are, of course, taken from the most recent example erected. They are representative types of the rural cottages owned by laborers who are employed on the estate and the surrounding district; built so as to pay a remunerative interest on the money expended.

These cottages have a large living room which is conducive to the healthiness and comfort of the occupants. Some of the houses have a parlor, but the general opinion in the district is that it is not always desirable since it costs money and gives little return for the materially increased labor. It is essential for economy in construction that the whole accommodation of the house should be under one roof and only in the cases of dormer windows shown should there be any additional roofing. There is no doubt that the addition of dormers add to the attractive appearance of the design. But it is also well known that the addition of barge boards and external woodwork does not reduce the cost of painting and upkeep. No expenditure was attached to anything that has not been necessary to the stability of the building, nor has any kind of doubtful ornament been used.

The internal finish of each house is of plaster with wood skirting and finishings, while a large dresser has been provided in the living room. The coal and fuel store is quite handy and has an internal entrance.

In the small houses the salt glaze waste up sink is in the living room, while in the large house the sink is in the scullery, fitted with draining board and plate rack over. On the first floor the bedrooms are arranged with every possible convenience and comfort which any working man's family requires.

The cottages are built in pairs or in foursomes, the flues from the open fire place being grouped together as much as possible for the reason that such a condition helps to produce a satisfactory draught. By the cottages being built in pairs some outer walls have been eliminated, while it is much easier to give a pleasing exterior appearance. But in no case does a group consist of more than four houses.

The material used for the fabric is brick, cement and tile. In each example the facing brick is of a very uniform color and machine made. In using the English bond the bricks have been set with scrupulous regularity making a most complete mechanical repetition of heads and stretchers throughout the wall. Every wall, angle, window frame, chimney and roof line is cut so exactly to the pattern that one would say some great machine had turned out the wall and its accompanying features. Although there is no doubt that the work throughout has been inspired by the plumb line and rule yet the general appearance is very effective.

In the first story of the brick and cement house the upper walls are built of common brick and finished with two coats cement and a finishing coat of rough cast to imitate a poured in story. In the cement house this same method is adopted for all the external walls. This type of walling has unquestionably been adopted to effect a saving, but with this kind of fabric no great saving could be effected since, at the most, the difference in cost of a cottage with concrete walls and with brick wall would be ½c. per cubic foot, while in many cases where the material is not found on the spot the saving for a cottage would only be about $50. Therefore, it would be unsafe to conclude that with one story of concrete finish it would mean a great reduction on the cost of the house. All the roofs are of red tile, made by a mechanical accuracy which prevails throughout.

The interiors of these houses are not papered but are treated with some water paints obtainable in the local market. These are not expensive and possess excellent sanitary qualities in addition to their durability. The cost of these cottages on a basis of nine cents per cubic foot is for brick cottages, $1,530 per house; brick and cement cottages, $1,265 per house; cement cottages, $725 per house. In many districts the cement walls might reduce the initial cost but are decidedly the most expensive in the end.

IT IS CLEAR that the same governing principles involved in designing houses for suburban garden schemes or town planning projects equally concern small undertakings, such as individual isolated cottages, or groups of small houses erected on separated sites by independent owners or landlords; and so far it really matters but little whether cottages form part of a large estate of this sort or not. The main differences consist in the scheme of a lay-out considered in the relation of one dwelling to another, and in the disposition of varied buildings when planned for communities, and grouped together in due conformity to a comprehensive lay-out as generally understood to apply under the term of a "garden city." Such undertakings as these as a rule are contrived to accommodate the maximum number of tenements without actual crowding, though set out in compliance with a commercial basis. The dwellings themselves differ in values, of course, to meet differing means. They may be built in blocks of two to five, six, or even more houses, and these groups are interspersed with detached residences contrived singly or in combinations to fit the allocation of the land to the best financial advantage without perhaps detracting from the pictorial point of view, which is fully recognized as an economic value. Proportionate use is made of the physical peculiarities of the estate, and a due regard is allowed to the immediate environment of the property. . . . . forethought further provides that the scheme shall be so designed as to facilitate social considerations. After recognizing all these admirable provisions, it remains to remember that the personal requirements of those who live in properties of this kind differ after all but slightly from other people, and their needs and habits are equally applicable to homes elsewhere. . . .

The artistic or architectural fitness of every sort of garden city dwelling must invariably be reliant upon the capability of the architect employed, notwithstanding the socialistic ideals permeating such comprehensiveness. This fact brings into prominence in a remarkable degree how essentially individualistic good design always is and inevitably must be. . . . There is no reason why in capable hands the buildings should not also be made picturesque and homely. A workmanlike result is by no means identical with ugly and ungainly farmsteads spoiling the countryside, and which are quite as likely to prove unsatisfactory, while they certainly are not only ungainly in appearance, but detrimental to those who have to continually see and use them. It costs very little more to employ the right man fitted for the work.—*M. B. Adams.*

The Royal Gold Medal for 1913

REGINALD BLOMFIELD, A.R.A., F.S.A., was the recipient of the Royal Gold Medal for 1913, the gift of the King, bestowed on the recommendation of the members of the R.I.B.A. The Right Hon. the Earl of Plymouth, in performing the ceremony of investiture, said in part:

"It is—the Royal Gold Medal—I think I may say, the highest award that can be given, the most important recognition that can be won in the architectural profession throughout the British Empire, and Mr. Reginald Blomfield is about to join that small body of eminent men who in past years have been deemed worthy to receive this honor. It has been my good fortune to be associated rather closely with Mr. Blomfield on more than one occasion lately, and I have learned to appreciate his breadth of view, his knowledge, his wide sympathies, and the very high position he maintains as the representative of the great profession of architecture in England. I have had a happy feeling of security in these cases that if any responsibility rested upon me it would be he who would take the larger share. He will, I hope, forgive me for adding this personal note—namely, the very deep regard I feel for one who is so sensitive, as I know him to be, for the honor and repute of the great profession which he adorns. With regard to his achievements, apart from his architectural work: as you know, he has written much, he has written upon Renaissance Architecture, not only in this country, but also in France. He has written most ably upon the Formal Garden in England, and on other subjects relating to architecture, wherein the knowledge of his subject and his sound criticism are clothed in a literary style which makes these volumes no less delightful to the amateur than useful to the student. No one who has followed Mr. Blomfield's career from Haileybury, where he was educated, through Oxford University, at Exeter College—of which he is now an Honorary Fellow—can be surprised at this achievement, showing, as it does, the refining influence and the clear expression of the scholar. As to his works in stone and in brick, it would be presumptuous in me to attempt to review them in detail. They are necessarily more familiar to most of those present than they are to me. But I do know and admire not a few of them. We can all refresh our memories by examining the photographs and drawings displayed on these walls; and, so far as his work in architecture is concerned, I think it may be safely left to the judgment of all lovers of good architecture. I have now only to hand this Medal to Mr. Blomfield on behalf of every one in this room, and, doubtless, with the congratulations of many more outside it. I offer him our sincere congratulations, and on behalf of the very few in this room who are entitled to do so—if they will allow me the privilege—I venture to express their welcome to him most heartily amongst the elect who have received the highest award of merit that can be given in this country to the great profession of architecture, of which he is so distinguished an ornament."

Mr. Blomfield, acknowledging the award of merit, said: "It is usual for our Gold Medallists to make an address on such occasions as this. But before I do so, let me thank you, Lord Plymouth, for the extremely kind things you have said—much too flattering, I am afraid, as they always are on these occasions, but it is nice to hear such kind remarks. I thank you also for the graceful compliment you have paid the Institute by coming here to-night to present the Medal, and you, my colleagues, most sincerely for the honor you have conferred upon me. There are honors that may seem to result from a fortunate combination of circumstances, and though the recipient may feel like a man who has suddenly come into a fortune, he does not value them so much as those which he owes directly to the choice of his colleagues: because it is by their judgment in the long run that he stands or falls. They know his limitations as well as his powers; and if with this knowledge they still feel able to nominate him for such an honor as the Gold Medal conferred by his gracious Majesty the King, he has some ground of hoping that his success is not a mere flash in the pan. I need hardly say that I esteem it a very high honor to be included in the list of our Royal Gold Medallists. There can be no greater encouragement to any architect who still has his eye fixed on the future. But these things lie in the lap of the gods; and it is well to look backwards as well as forwards, and to endeavor to place ourselves in touch with the mighty men of old. I am a firm believer in tradition. In the pride of youth one is tempted to say, with Sthenelus, son of Capaneus,

Ἡμεῖς τοι πατέρων μέγ᾽ ἀμείμονες εὐχόμεθ᾽ εἶναι
Τῷ μή μοι πατέρας ποθ᾽ ὁμοίῃ ἔνθεο τιμῇ.

" 'We boast ourselves much better than our
fathers, rank them not therefore with me.'

"Yet our fathers before us put up a good fight for what they believed was right, and though the methods and occasions of fighting vary with every age, the essential thing is to remember and maintain that gallant spirit, that high standard of honor, that brave endeavor after noble aims, which are of more value than any particular success. Therefore this evening I shall take as my text the words of the Preacher: 'Let us now praise famous men . . . leaders of the people by their counsels . . . wise and eloquent in their instructions.'

"It is a far cry back to that little meeting at the Thatched House Tavern in the year 1834 when some half-dozen architects met together to consider the formation of an Institute of Architects. There were present, among others, Barry, Bellamy, Decimus Burton, Fowler, Goldicutt, Gwilt, and Hardwick; and of these we may say with the son of Sirach: 'There be of them that have left a name behind them that their praises might be reported, . . . and some there be which have no memorial, but these were merciful men whose righteousness hath not been forgotten.' Their buildings have been less fortunate; so we may leave them there, and pass on to Decimus Burton, who, after long years of neglect and oblivion during the days of the Gothic revival, has now come into his own again, and recovered the appreciation that he fully deserved, for he was a very accomplished architect, learned in his art and fastidious in his taste. Few, if any, better things in their way have been done in London in the last hundred years than the screen at Hyde Park Corner, and the hall and staircase of the Athenæum. Burton had caught something of the spirit of the architects of the great Imperial Thermæ. His work is genuine Classic, but it is the Classic of a civilization not remote as that which inspired the Parthenon, but in a way familiar to us and relatively scarcely less advanced than our own. Burton lived to a great age; he was not a Gold Medallist, or a member of the R.A., and, though his career must have been singularly successful, when he died at St. Leonards a few years back he was almost forgotten by the general public.

"Of the others who met at the Thatched House in 1834 Barry became Sir Charles Barry, Gwilt wrote his immense *Encyclopedia,* and Hardwick was the well known architect of Euston Station, and of the Goldsmiths' Hall. The Institute was established the same year as this meeting. Lord de Grey was elected President, Donaldson and Goldicutt Hon. Secretaries, and among the Council were Barry, Decimus Burton, Basevi, and Philip Hardwick. Sir John Soane made the new Institute a handsome donation, and in 1837 a Royal Charter was granted by William IV. All these things are stated in our Kalendar, but I make no apology for introducing them to-night to those of our audience who are not members of this Institute, or even for reminding those who are, of the long and distinguished tradition of the Body to which they belong. It is a good thing now and again to hark back to the hill on which we were born.

"I now come to the Royal Gold Medallists of the Institute, and here I have a curious piece of information unearthed for me by our Librarian, Mr. Dircks, to whom I am indebted for some very interesting notes which he has been good enough to collect for me out of the Records of the Institute.

"In the year 1846 Queen Victoria consented to grant annually a Gold Medal for promoting the purposes of the Institute, and the Council decided that this should be offered annually for 'designs calculated to promote the study of Grecian, Roman, and Italian architecture.' (You will note in passing that the Council, so far, was faithful to the tradition of classical design; the possibility of Gothic was not even thought of.) Tite, Charles Barry the elder, Angell, Donaldson, and Sydney Smirke drew up the conditions, and the subject set was 'a building suitable for the purposes of the Institute, at a cost not to exceed twenty thousand pounds.' The result was disappointing. The assessors reported that 'not more than one of the designs possessing the slightest pretension to consideration as an architectural composition could be properly executed for less than double the sum specified.' Our grandfathers did not beat about the bush, and there is a fine flavor of the polemic of the previous century in this extremely blunt announcement.

"No award was made, and the Council thereupon revised their arrangements and decided to award the Medal on the basis that holds to this day, for distinguished services to architecture without regard to nationality. It would be impossible to deal with all the names of its recipients. They include famous architects and writers on architecture from France, Germany, Austria, Italy, Holland, and America, in addition to most of the best-known architects of this country during the past three generations. I find that it has been awarded in France to such men as Hittorff, Viollet-le-Duc, the Marquis de Vogue, Garnier, Choisy, and Daument; in Germany to Schliemann and Dorpfeld; in Italy to Canina and Lanciani; in Austria to Von Ferstel and Hansen; in Holland to Cuypers; and in America to Hunt and McKim; and if you pass in review the names of the Gold Medallists of this country you will get a pretty clear insight into the movement of architecture and the trend of artistic thought from the period when the Medal was established down to the present day. The old Guard was gradually worn down; Cockerell, Barry, Smirke, and Hardwick were succeeded by the champions of the Gothic Revival, and now their day is past and their lesson learned, and we move again, at least I personally hope so, in the calmer waters of the older tradition, developed and extended by its applications to modern needs. I can select only a few typical names from among the distinguished men who have been awarded the Gold Medal of the Institute.

"Early in the list appears the name of Thomas Donaldson, who received the Gold Medal in 1851, and was President in 1863 and 1864. Though not the first to receive the Medal, he did so much for the Institute that we look on him to a great extent as one of its founders. Donaldson was typical of men whom we have always been fortunate in possessing as members of this Society. He was not a great architect, but he was a man of much energy and business capacity, with a high sense of public duty, and he devoted his considerable powers as an organizer and administrator to the formation and development of this Institute. He laid the foundation of a tradition of public utility and high educational purpose which I am glad to say has never been forgotten or abandoned within these walls. He added largely to our splendid architectural library, both in the way of books and drawings, and the badge of office which I have the honor to wear was presented by him to the Institute. Romance appears but rarely in the careers of modern architects, and some, at any rate, of these eminent men had a more adventurous youth than is given to most of us nowadays. Donaldson, who died at the age of ninety in 1885, had gone out to the Cape of Good Hope in 1809 intending to enter a merchant's office; but he joined a force of volunteers that was proceeding to the attack on the Mauritius in the hope of obtaining a commission in the Army. As, however, the French retired without firing a shot, Donaldson's vision of military glory vanished. He returned to England, entered the school of the Royal Academy, travelled widely in Greece and Italy, became an architect and Professor of Architecture at University College, and devoted a long and most useful life to the public and professional aspects of architecture, and to the development of research into all that concerned the history of the art.

"Charles Cockerell, who received the first Gold Medal in 1848, was a few years older than Donaldson, and represents, to me at any rate, the other type of architect—the man absolutely immersed in his art, a scholar and an artist with a passionate enthusiasm for all that bore on the history and technique of architecture. That enthusiasm never flagged to the end of a long and fortunate life. I have heard Norman Shaw describe the fascination of the lectures that Cockerell gave at the R.A. when he himself was a student there. Whatever his subject, Cockerell was very soon back among the scenes of his travels and adventures. He forgot his audience in living again those brilliant enterprises of his younger days; and went on pouring out reminiscence after reminiscence till something recalled his attention to the fact that he was not in Greece or Asia Minor, but in the Lecture Room of the Royal Academy. Cockerell—who, besides being a beautiful draughtsman and a sensitive artist, was a fastidious gentleman—had certainly exceptional advantages, but he used them well. He steeped himself in the architecture of Ancient Greece, and carried into his own work something of its delicate and austere reserve. That an artist of such enthusiasm should have his limitations was inevitable. A certain coldness of temperament and a certain academical perfection and propriety may sometimes arouse in more warm-blooded artists an irresistible desire to kick over the traces; but his buildings have always a distinction rare in modern architecture, a certain well-bred personal quality that reveals itself as something beyond the reach of merely conventional accomplishment.

"Sir Charles Barry received the Medal in 1850, and on the death of Lord de Grey, who had been President of the Institute from 1835 to 1859, he was offered the Presidency but declined it, probably for reasons of health, for he died in the following year. Barry was a thoroughly well-trained architect, and it is to be noted in the case of nearly all these famous men that they devoted a good deal more time both to their apprenticeship and to subsequent study abroad than is the fashion at the present day. Five years' apprenticeship, followed by two or three years' study of ancient buildings abroad, was by no means unusual in the training of architects eighty years ago; and though fashions change and the technical detail of that generation may be out of favor with this, there can be no doubt that these men were thoroughly well trained in the technique of architectural design, the more so as they were able to concentrate on it exclusively, instead of having to devote a considerable part of their energies to the acquisition of that applied science which has become a necessary part of the equipment of the modern architect. Barry travelled extensively in France, Greece, Turkey, Syria, Palestine, and Egypt, and this Institute is fortunate in possessing the diaries of J. L. Wolfe, his travelling companion during these three years. Quite recently a very high compliment was paid to Barry in these rooms by a well-known American architect. Mr. Hastings referred to him as one of the most remarkable architects of the nineteenth century, for his powers of planning a big design. Most of his detail is out of fashion and rather dull, but his great ability as an architect is so generally recognized that I need not remind you of his buildings. Two points, however, are noticeable in his work: signs of the rift in the great tradition of English Classic, warnings of the upheaval that was to supersede it. The first is his choice of model, the second his complete surrender of it on a memorable occasion. Whereas Cockerell had definitely elected for Greek models and inspiration, Barry reverted to the more florid traditions of the Italian Renaissance, even following Italian originals pretty closely in his designs for such clubs as the Travellers' and the Reform. Up till comparatively recently Barry's lead was followed in most of our public buildings. Now the pendulum has swung back to Greek motives seen through French spectacles. My personal impression is that both Cockerell and Barry were a little off the line, and that those who have blindly followed either the one or the other of these distinguished men may perpetuate a fundamental mistake, that of a too direct revivalism and reproduction, which must be sterile in its results however ably it is done. Had either of these men picked up the simple tradition of English Classic at the end of the eighteenth century, and used it frankly to meet the conditions of the day, we should have been spared years of wasted effort; but owing to causes far too intricate to be touched on now, the Lord of Misrule had flung his cap into the arena of architecture, and the first momentous intimation of this was the decision, forced upon Barry, to design the Houses of Parliament in the Gothic manner. There is a suggestive sentence in the Report of the R.I.B.A. Council for 1839. Referring to the Commission appointed to investigate the stones to be used in building the Houses of Parliament, it says: 'The investigation may lead perhaps to the adoption of a stone more brilliant in hue than those at present in general use, so as to shed somewhat of the glow of an Attic or a Roman tint upon the architectural features of the public edifices of London:' a pious aspiration scarcely realized in the Houses of Parliament designed by Barry with details by A. W. Pugin. There is no need to revive the worn-out controversy as to who did it. Probably it was a genuine case of cooperation, Barry giving the scheme and general arrangement, and Pugin the detail—detail, by the way, as good as anything of its kind that has ever been done in modern Gothic.

"Pugin never had our Gold Medal; in the light of what followed he surely deserved it, for it was the zeal and enthusiasm of this apostle of modern mediævalism that brought out the fighting qualities of the younger generation, and won the day for Neo-Gothic. When one considers that there were solid men such as the Smirkes, the elder Hardwick, and Tite, who practised their weighty Classic with unvarying success, it was a remarkable thing to have done. Later on, Tite, who became Member of Parliament for Bath, made a violent attack on Scott's Gothic design for the new Government buildings and, faithful to his convictions, founded the Tite Prize of the R.I.B.A., for the best design of a given subject, according to the methods of Palladio, Vignola, Wren, and Chambers — a counterblast to the Pugin Studentship, established some ten years earlier, for the promotion of the study of the mediæval architecture of Great Britain and Ireland.

"Hardwick, it is true, designed the Lincoln's Inn Library, but I have always understood that the late John Pearson was a young man in his office at the time; and Hardwick's real quality as a designer is best shown in the Propylæa and the impressive Hall of Euston Station, and in the Goldsmiths' Hall.

"Sir Robert Smirke takes us back into the eighteenth century, for he was born in 1781. He was made an R.A. in 1811, and received the Gold Medal in 1853. One of the best of his buildings, and one of the best examples of the masculine Classic of his time, the General Post Office, has disappeared within the last year, not without a gallant effort to save it on the part of this Institute. Sydney Smirke, his younger brother, who designed the Reading Room in the British Museum, was awarded the Gold Medal in 1860, and from 1861 to 1868 was Professor of Architecture at the Royal Academy, a post which has now been filled by five of our Gold Medallists. The Smirkes were, I take it, the last representatives of a tradition of Classic derived from Sir Wm. Chambers, filtered through the publications of the Dilettante Society and later of Hittorff and Zanth. Robert Adam's manner, graceful and accomplished as it was, was to some extent an original invention of his own, as indeed he believed it to be himself. Cockerell's manner was not less personal than that of Adam. The final version of Chambers' ideas of civil architecture, somewhat debased and a good deal vulgarized, appeared in the work of Tite and Robert and Sydney Smirke.

"In this rapid survey I have now come to the point at which we reach men with whom some of us, at any rate, were personally acquainted. We have passed the disastrous days of the great Exhibition. Digby Wyatt, a man of wide knowledge but no definite bent in design, received the Gold Medal in 1866; but I take it, it must have been a little in the nature of a consolation prize, for the eclecticism and compromise of his generation were things of the past, architecture was deep in the whirlpool of the Gothic Revival, and the cry was raised, that is being raised again to-day, that the architect and his T-square are the *fons et origo malorum*, and that salvation is only to be found in the untrammelled genius of the working man. But the architects were energetic and astute, and they rode the storm with most remarkable skill.

"George Gilbert Scott, who received the Gold Medal in 1859, was President of this Institute from 1873-76, and was, I take it, quite one of the ablest men of his time.

"How many hundreds of churches he dealt with has never been known, possibly Scott never knew himself. There is a story that I had from a well-known pupil of his, that Scott once found himself at a remote station in Yorkshire, and was compelled to wire to his head clerk: 'Why am I here?' Probably no other architect has ever left his mark on the historical buildings of his country to such an extent as the late Sir Gilbert Scott. In his *Recollections,* written in 1873, he stated: 'I had been one of the leading actors in the greatest architectural movement which has occurred since the Classic Renaissance.' The value of the movement is open to question, but there can be no doubt of the fact that Scott was for a time its most redoubtable protagonist; and the *Dictionary of National Biography* informs us that 'his excessive energy in restoration and renovation led to the formation, in the last years of his life, of the Society for the Protection of Ancient Buildings.' I fear our generation is not particularly grateful to the zeal and enthusiasm, amateur or professional, of the sixties and seventies. From the point of view of professional practice, those days must have been a glorious time for architects. There were not too many architects about, the landed interest was extremely prosperous and ready to support its views on art and religion by putting its hand deep in its pocket. Everywhere there was a fine glow of sentiment and romance, unimpeded by a too exact knowledge of the facts of architecture or practical understanding of its functions. A heavy reckoning has had to be paid for those happy days of romance. It is not only that our historical buildings have suffered. That has happened elsewhere, as in France, to an even more disastrous extent. The real mischief has been the confusion that has arisen between architecture and craftsmanship—a confusion that eighty years ago would have been inconceivable—and the result of this ill-balanced zeal for craftsmanship was that the purpose of architecture was all but forgotten in England, and it is only within the last few years that there has appeared unmistakable evidence of a return to a saner tradition. It is useless to write history backwards, but one cannot help speculating what men of such great ability as George Gilbert Scott, Street, Pearson, or Bodley might have done for modern architecture if they had been trained in Classic design instead of in the details of Gothic.

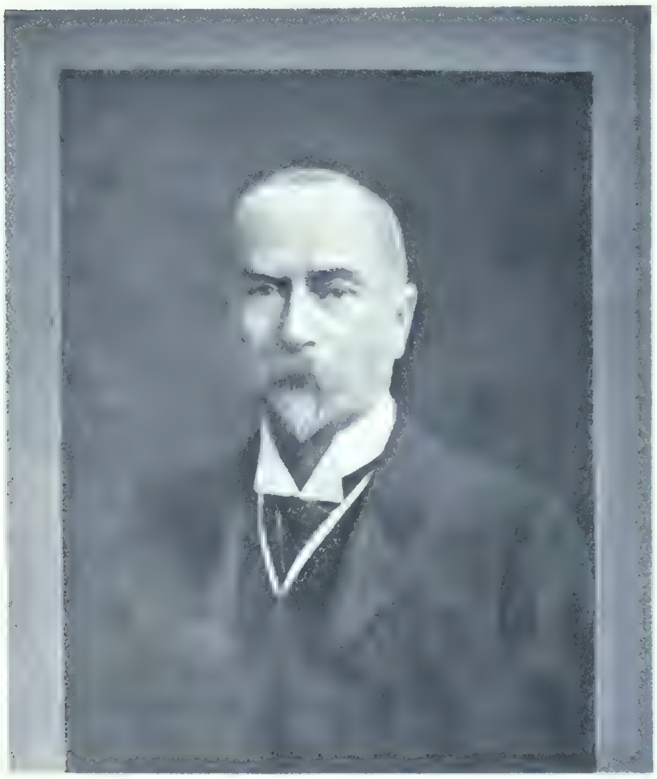
"Yet as the movement approached its end the conviction of its leaders became almost fanatical. In 1855 Street had written: 'I have no reason whatever for doubting that if we wish for a purer school of art we must either entirely forget the works of the Italian Renaissance architects, or remember them only to take warning by their faults and failures.' Some twenty years later Street could hardly forgive Bodley for straying beyond the orthodox boundaries of Gothic into the amiable French Renaissance of the London School Board Offices; and he himself nailed his colors to the mast in the last great effort of his life, the new Law Courts, a really monumental work, however much one may criticise it in detail. Street was not only a very able architect; Norman Shaw used to say that Street was a man who would have made his mark in any calling that he had put his hand to, and, though without academical training, he wrote most excellent English. He was also a man of strong convictions, and a very dominant individuality. My impression of him remains as I saw him in 1880-81. I was working against time in the schools of the Royal Academy, being indeed anxious to get away for a cricket match in the country; our old friend, Phene Spiers, brought in a burly bearded man, who tramped across the room and asked me what I was doing. In my haste I answered shortly, but was met by a good-humored smile, and the visitor retired. I learned afterwards that this was Mr. Street, and the impression that I formed of him as a strenuous and most capable personality, strong in his views, and indifferent to convention, was, I believe, the right one. I just recollect, too, that memorable election, in the last year of his life, when the forces of Art and those of Business were set in battle array, and Art won a brilliant victory: a victory cut short, alas! by Street's untimely death.

"Since these days we have learned from adversity the necessity of combining business aptitude and art. Since these days, too, the battle of the styles has dropped into oblivion. The point of view has shifted, or rather we have come to see that all vital art must be a personal expression—that architecture, not less than the other arts, is the expression of an idea, with this condition added, that it must also be the fulfilment of a particular and specific need. Thus these questions of archæology fall away of themselves. We use in architecture a language based on the past, just as in common parlance we use the language which has resulted from long generations of use; but we do not use language for the sake of using it, we use it to express a definite idea, we have no more use for the mere stylist than we have for the mere rhetorician. The days of the revivalist are, I hope, finally numbered.

"But I have wandered from my point. I set out to praise the mighty men before us, and on that note I should like to conclude my address. We live so fast nowadays that we have little time to look behind us; yet it is well to pause now and then to pick up our place in the line of long descent, and to remember the tradition of the past. This Institute has been in existence for nearly eighty years. It is second in point of age only to the Royal Academy and the Royal Society of Painters in Water Colors. I have mentioned to-night a few only of those who in past years have played a great part within the walls of this Institute. Others, scarcely less distinguished, might well be mentioned, and I have said nothing of our contemporaries. Yet I have hoped to suggest to you something of the great tradition of this Institute, and to recall to your memory the part that it has played in the development of modern architecture. I do not doubt that that tradition will be worthily maintained by this and succeeding generations. We ourselves are in the position of trustees for the younger generation, and we are bound to take a far-reaching view of the duties of our trust. Much of the work of the Institute must necessarily be concerned with details of administration, and members have always given their services for the purpose in the most ungrudging spirit. But a wide outlook in the arts is in accordance with our best tradition, nor do I think its members are likely to forget the high purpose for which this Institute exists, for the advancement of architecture, *'usui civium, decori urbium.'* "

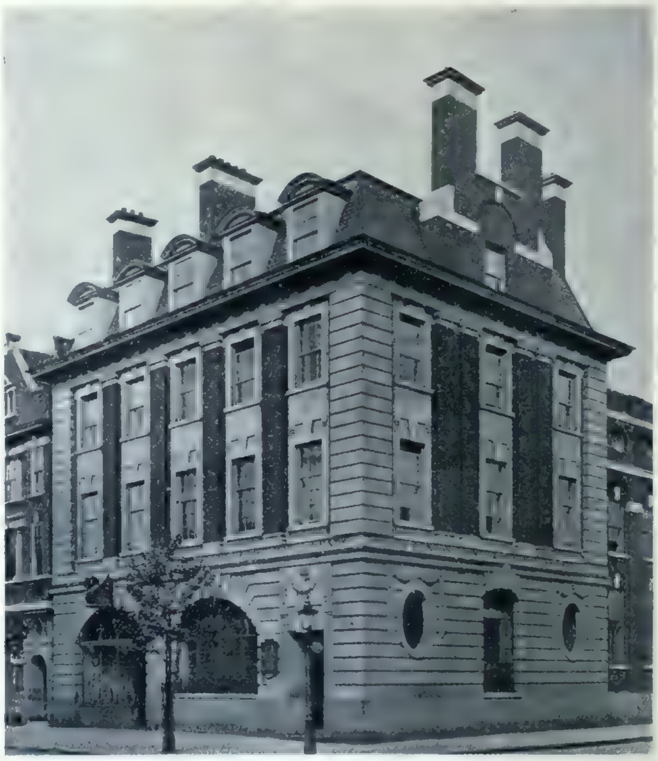
In offering a resolution of thanks, the Rt. Hon. J. A. Pease, P.C., said that Mr. Blomfield reminded them of the last eighty years, of the traditions of the past and the development of architecture. He has recalled Decimus Burton and his wonderful constructive genius displayed at Hyde Park Corner, he has gone down the list of many leading architects to the more recent ones of Scott and Street. He has reminded us also of various types and styles of architecture which are pleasant to recall and which have interested us all. I feel myself somewhat fortunate to be allowed to move this vote of thanks to Mr. Reginald Blomfield. Personally, I have for many years felt greatly indebted to him for perhaps one of his most humble works, but at the same time to me most attractive production, his "Formal Gardening in England." Government departments have often been indebted to him. No Government department has hesitated to seek his advice, because we have always known that his advice would be readily and also forcibly given. I also think it is not inappropriate that the Board of Education may to-night be associated with this resolution of thanks, because there are so many points of contact between education and architecture.

Mr. Blomfield in responding, said: "I thank you, Mr. Pease, for the very kind things you have said, and I should like to thank you and other visitors here for coming, because I consider it a compliment to the Institute. For public men to come here shows that they appreciate the importance of architecture in the life of the community."



REGINALD BLOMFIELD, A.R.A., F.S.A.

Reproduced from Journal of the R.I.B.A.



BANK IN CHELSEA BY R. BLOMFIELD.

CONSTRUCTION

A · JOURNAL · FOR · THE · ARCHITECTURAL
ENGINEERING · AND · CONTRACTING
INTERESTS · OF · CANADA

FREDERICK REED, Editor

H. GAGNIER, LIMITED, PUBLISHERS
Corner Richmond and Sheppard Streets,
Toronto - - Canada

BRANCH OFFICES:
MONTREAL—171 St. James Street
WINNIPEG, MAN.—13 Royal Bank Building
CHICAGO—People's Gas Building
NEW YORK—156 5th Avenue

CORRESPONDENCE—All correspondence should be addressed to "CONSTRUCTION," Corner Richmond and Sheppard Streets, Toronto, Canada.

SUBSCRIPTIONS—Canada and Great Britain, $3.00 per annum. United States, the Continent and all Postal Union countries, $4.00 per anum, in advance. Single copies, 35c.

ADVERTISEMENTS—Changes of, or new advertisements must reach the Head Office not later than the twentieth of the month preceding publication, to ensure insertion. Mailing date is on the tenth of each month. Advertising rates on application.

CONTRIBUTIONS—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and duly returned.

Entered as Second Class Matter in the Post Office at Toronto, Canada.

Vol. 7 Toronto, January 1914 No. 1

CURRENT TOPICS

THE MOST NOTED architect in Japan, Matusnosuke Moriyama, who recently made an extended visit to America for the purpose of studying the engineering phases of our modern buildings, in commenting on the skyscraper, says: Generally speaking, there is no architecture in America, in the real sense of the term. When I say that there is no architecture in this country, I make a clear distinction between a product of architecture and a mere building. There are many immense buildings in New York, but there are few that can be rightly regarded as the products of architecture proper. Most of them are nothing but mere accumulations of wood, stone, iron, and clay, because they have no artistic value at all. If you travel in Europe you will see many buildings of high architectural value. When you look at them they will appeal to you, and the impression you get will be entirely different from that you get out of most of the American buildings. The former impression comes from fine arts, while the latter comes from the mere accumulation of the building materials put together unartistically.

Mr. Moriyama attributes the lack of high-class architecture here to America's short existence; her lack of a delicate aesthetic taste, and her haste in building the nation. In referring to the possibility of a characteristic style in this country, he says: America has not her own school of architecture as yet, but a mere imitation of the French school. In the near future, however, the Americans will have their own. They will begin to modify the skyscrapers. They can not be satisfied with the mere accumulation of big boxes when their artistic nature demands a better type. I can see with a clear vision that the time is coming when there will be many beautiful skyscrapers in New York with high architectural merit. As the skyscrapers are an American production, America will have her own school, distinctly different from other foreign schools, when she has skyscrapers with architectural merit.

The Woolworth Building indicates this tendency. There has never been such a skyscraper as the Woolworth Building. It has beautiful sky lines, harmony and good proportion from an architectural point of view. I do not hesitate to say that it has been successful in all respects. When America has such skyscrapers as the Woolworth Building, the world's opinion of the American architecture will be entirely different from now.

In architectural engineering America is ahead of all nations of the world. You can find no country with a more scientific system of heating or better building materials. Though I can learn almost nothing about the architectural side of the buildings here, I am expecting to get more benefit in this country from the engineering character of them than in any other country in the world.

* * *

THOMAS HARDY, the English author who is to be awarded the Nobel Prize for literature, was born in Dorsetshire, England, June 1840. While Mr. Hardy is better known as an author of fiction, it is interesting to know that his early life was devoted to the field of art. After an education obtained in local schools, from Latin and French tutors and in King's College (London) evening classes, he became articled to an ecclesiastical architect in 1856, and worked at Gothic architecture under Sir A. Blomfield. He was a prizeman of the Royal Institute of British Architects in 1863.

Mr. Hardy's latest work, published this autumn, is "A Changed Man, and Other Stories." The prospective recipient of the Nobel honor, (a medal and sum amounting to $40,000), is frequently referred to as Britain's foremost living novelist.

ISIDORE FELDMAN has opened up an office for the practice of architecture at 44 Adelaide street west, Toronto.

* * *

SEVERAL of the recent buildings which have marked a progressive step in the progress of architecture, have used the Apollo-Keystone Copper bearing sheets, black and galvanized, in connection with the roofing, skylights and ventilators. This material is handled by the B. & S. H. Thompson & Co., Ltd., Montreal and Toronto. The selection was made after a thorough test and a guarantee by the United States Steel Products of an absolute corrosive resistance.

* * *

"THE YEAR BOOK of Canadian Art, 1913," compiled by The Arts and Letters Club of Toronto, contains some forty articles covering the whole field of art in Canada. The work treats of painting, literature, sculpture, music and architecture in a concise, wholesome manner, and contains illustrations relative to the various phases of our progressive art. Copies of this extremely interesting as well as instructive book may be obtained from the publishers, J. M. Dent & Sons, Toronto, for $1.00.

* * *

THE SEVENTH Annual Convention of Bird Neponset salesmen was held in Hamilton, Ont., December 15, 17. Bird & Son opened their Hamilton plant in 1905 and in spite of the general depression, announce the year 1913 to be the largest sales year in their history. Some twenty-five representatives attended the convention and enjoyed the elaborately arranged program along with a special tour of the industrial plants of the city. George E. Messer has managed the Canadian work for two years, while H. F. Everett has had charge of the mill superintendency.

* * *

BEGINNING December 11th, the Asbestos Manufacturing Co., Limited, of Montreal, held a two days' conference of salesmen and branch managers, at their Montreal offices, in the E. T. Bank Building. The discussions included a paper on Asbestos Textiles by H. V. Everham, Jr., of Boston; a discussion on Asbestos Pipe Coverings and contract covering work, by F. F. Cooper, of New York city; addresses on the manufacture and uses of Linabestos, their new wall covering, and other items of manufacture of this company. The representatives were entertained by the company at luncheon on the 11th, and on the same afternoon an inspection trip was made to the large plant at Lachine. The convention was concluded by a dinner on the night of the 12th, which was presided over by the President, R. V. Mattison, Jr., of Montreal and Ambler.

OFFICIAL BUILDING STATISTICS from the various centres throughout the Dominion present some food for careful thought. Certain cities which grew faster than necessity demanded have slowed up in the building line to allow their business activities to catch this overgrowth. Others have gradually surged ahead and are setting new marks which will be hard to surpass. Two examples are indicative of the vast difference between the depressive tendency and the growth in face of this false condition. During the month of November, 1913, the city of Montreal had three hundred and thirty-six permits at a valuation of $4,293,746, as against two hundred and ninety-two for the corresponding month of 1912 at a value of $2,983,986. The total amount for 1913 exclusive of December is $25,723,867, while that of the same period in 1912 was $18,957,280. Vancouver, on the other hand, for eleven months of the last year, totals $10,248,803 as against $17,898,067 in 1912.

* * *

A DECISION that will be of interest to architects was handed down recently by Justice Elwood when the claim of Munro & Mead, a firm of architects, for services in preparing plans for a grandstand, against the Yorkton Sask.) Agricultural and Industrial Exhibition Association, Ltd., was allowed. Some time ago the defendants asked the plaintiffs to prepare plans for a grandstand, with a seating capacity of 2,000, to cost not more than $14,000. When the tenders were opened, it was found that the lowest was $19,000. The plaintiffs were, therefore, instructed to get out plans on a smaller scale. The tenders again were higher than the estimates, and the defendants decided not to proceed with the work, and declined to pay for the plans. For the judgment, the plaintiffs are awarded $680, made up as follows: $490 for the first set of plans; $180 for the second set, and $10 for staking out the ground.

* * *

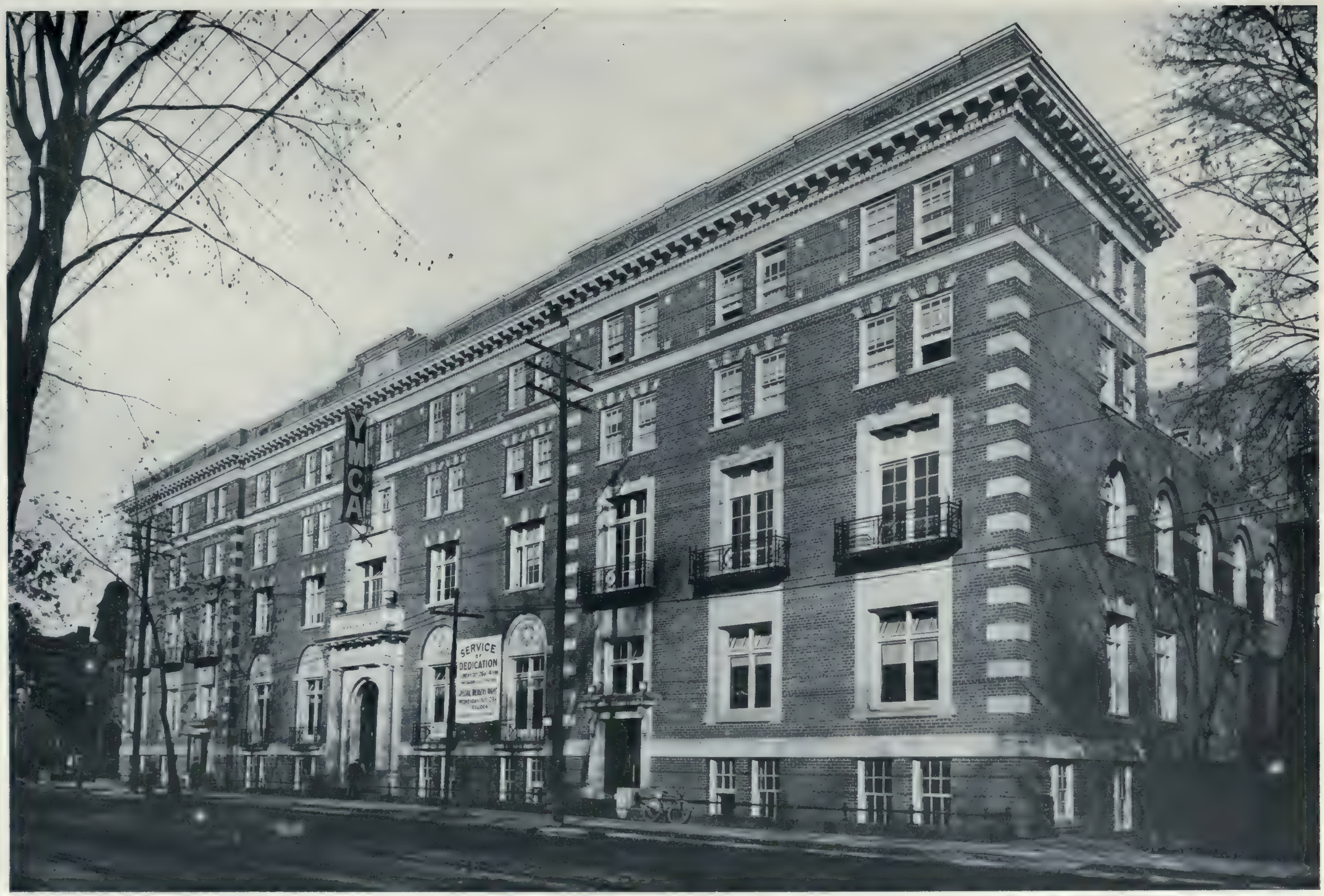
THE LAST WORD

in the art of manufacturing High Grade Surveying and Drawing Instruments has been developed in the Dietzgen Instruments, the possession and use of which guarantees accurate results.

Scales, Slide Rules, Draughting Equipment and Accessories of a complete list are also manufactured by us and sold direct to the Architect and Engineer.

BLUE PRINTS
made from tracings a specialty.

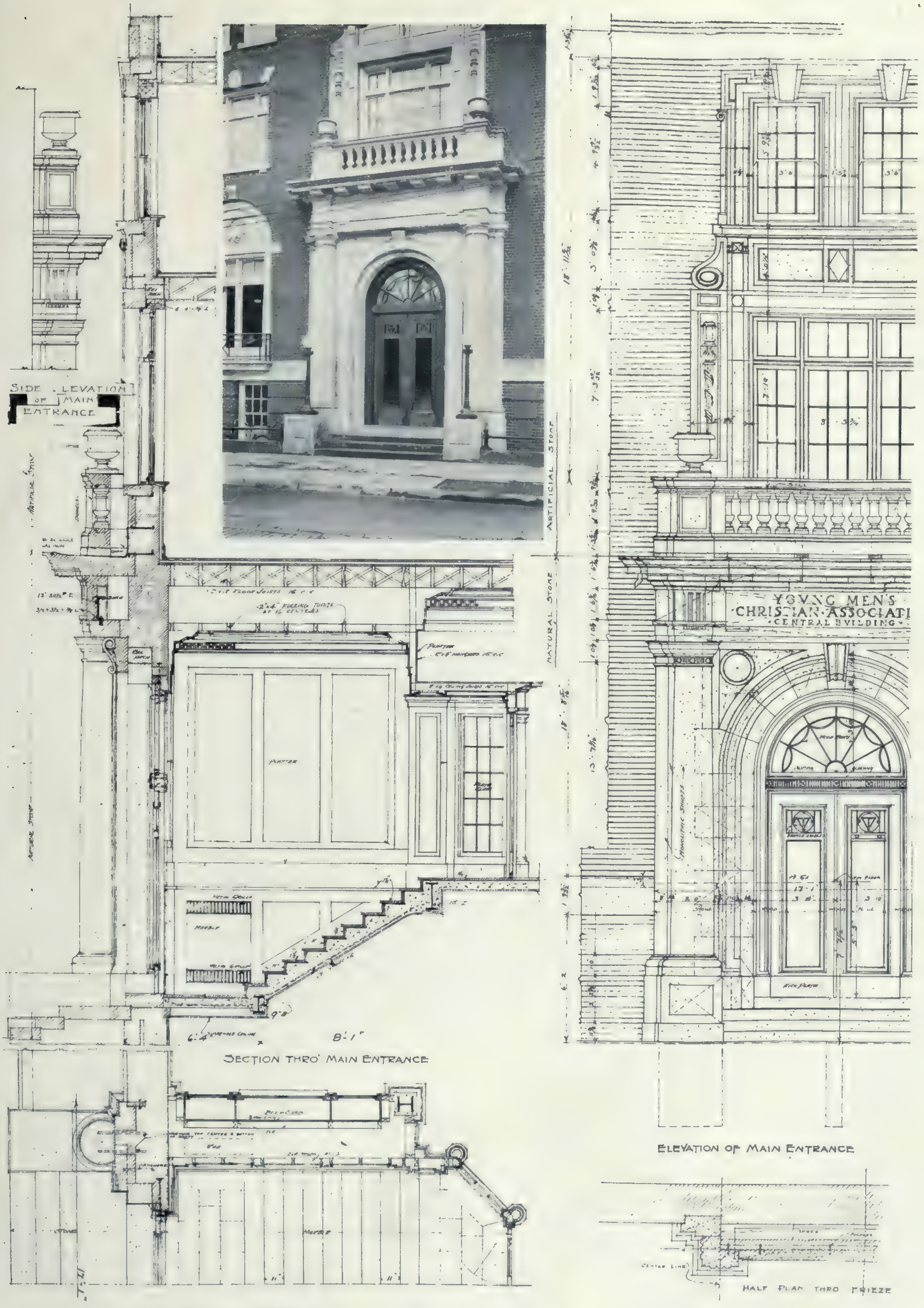
EUGENE DIETZGEN CO., LTD.,
116 Adelaide St. W., Toronto.



"Construction," 1914.

CENTRAL Y.M.C.A., TORONTO.
BURKE, HORWOOD & WHITE, ARCHITECTS.

Plate IX.



SIDE ELEVATION OF MAIN ENTRANCE

SECTION THRO' MAIN ENTRANCE

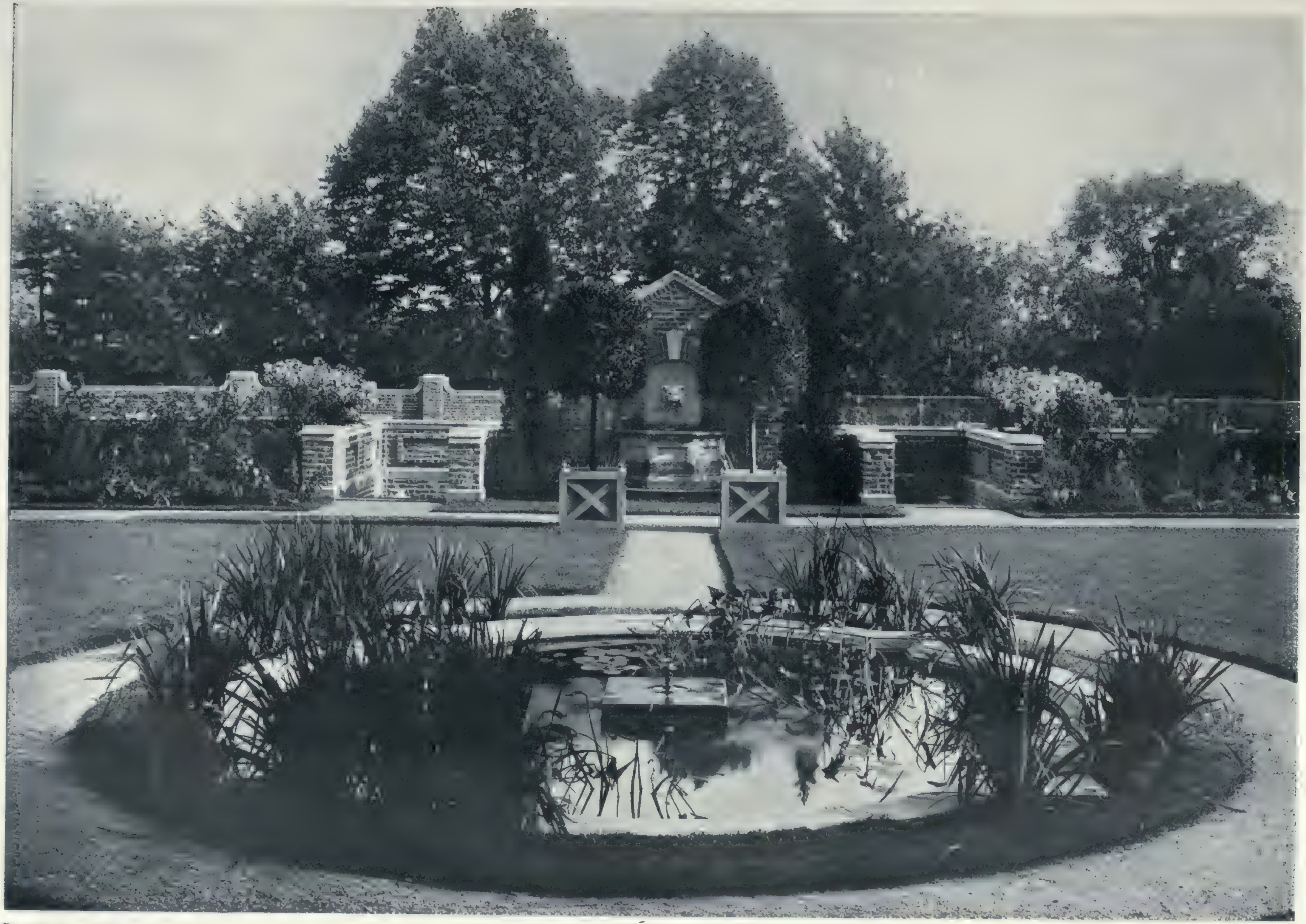
ELEVATION OF MAIN ENTRANCE

HALF PLAN THRO FRIEZE

HALF PLAN OF MAIN ENTRANCE

CENTRAL Y.M.C.A., TORONTO.

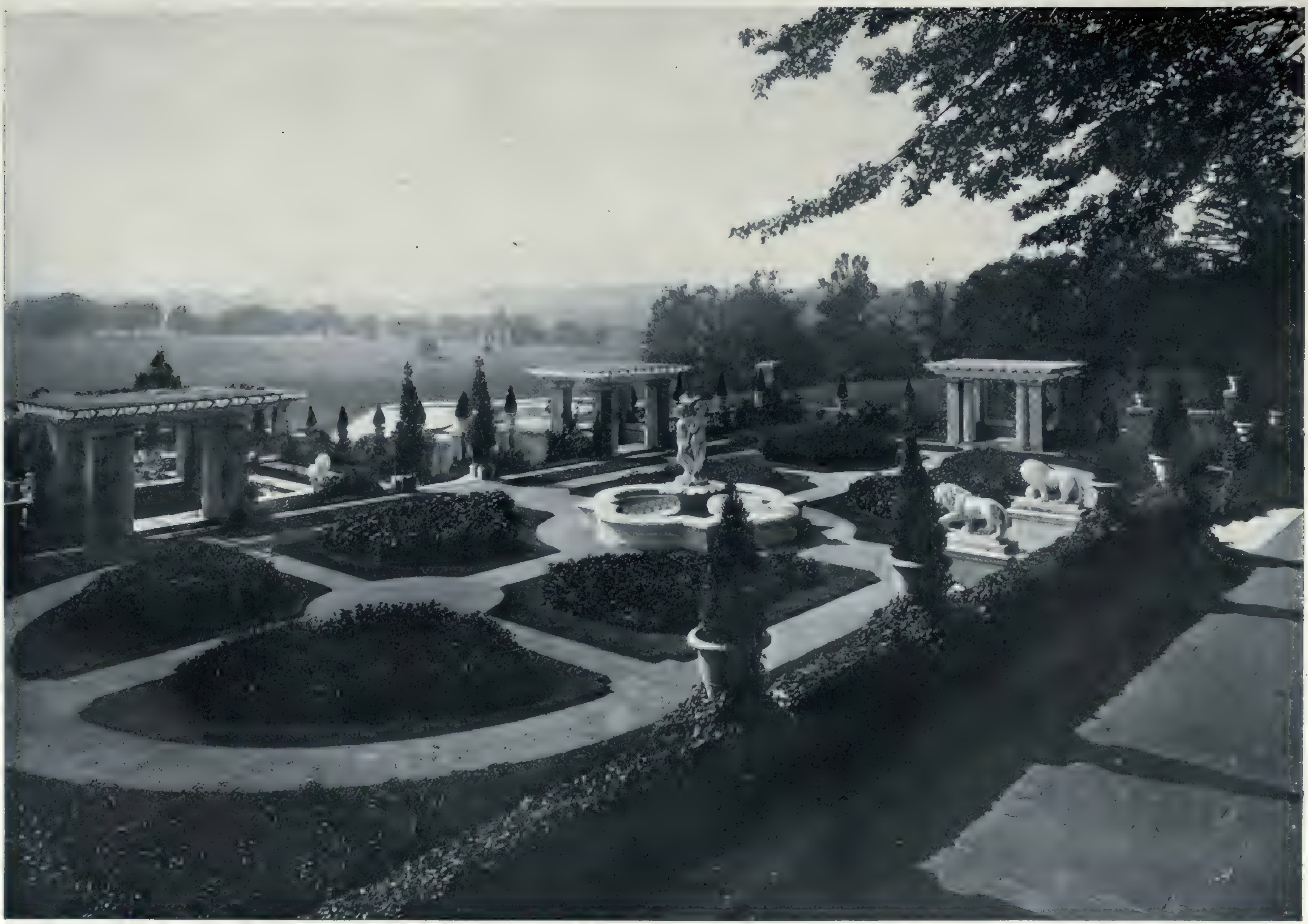
BURKE, HORWOOD & WHITE, ARCHITECTS.



"Construction," 1914.

ILLUSTRATION OF FORMAL GARDEN.

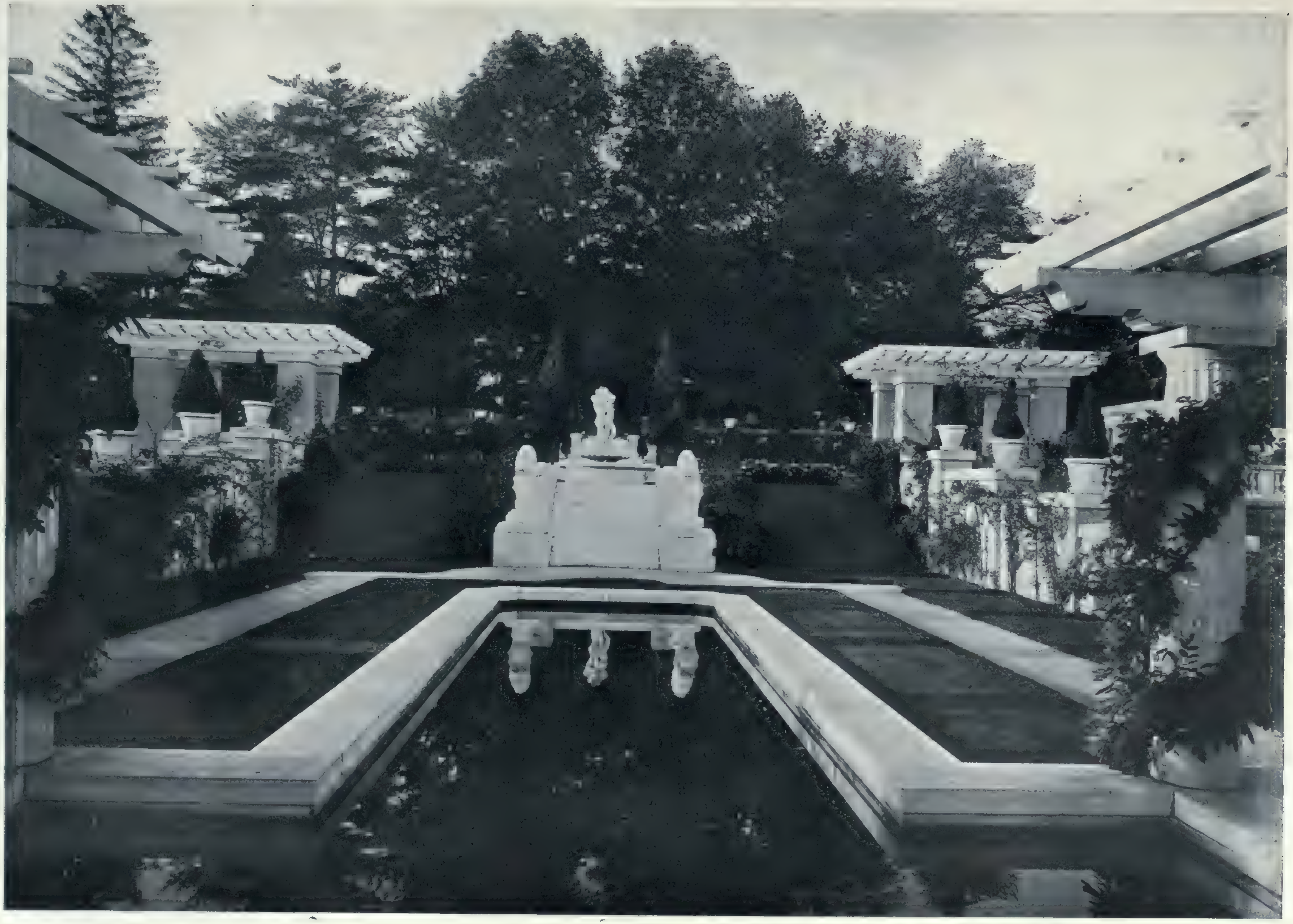
Plate XI.



"Construction," 1914.

ILLUSTRATION OF FORMAL GARDEN.

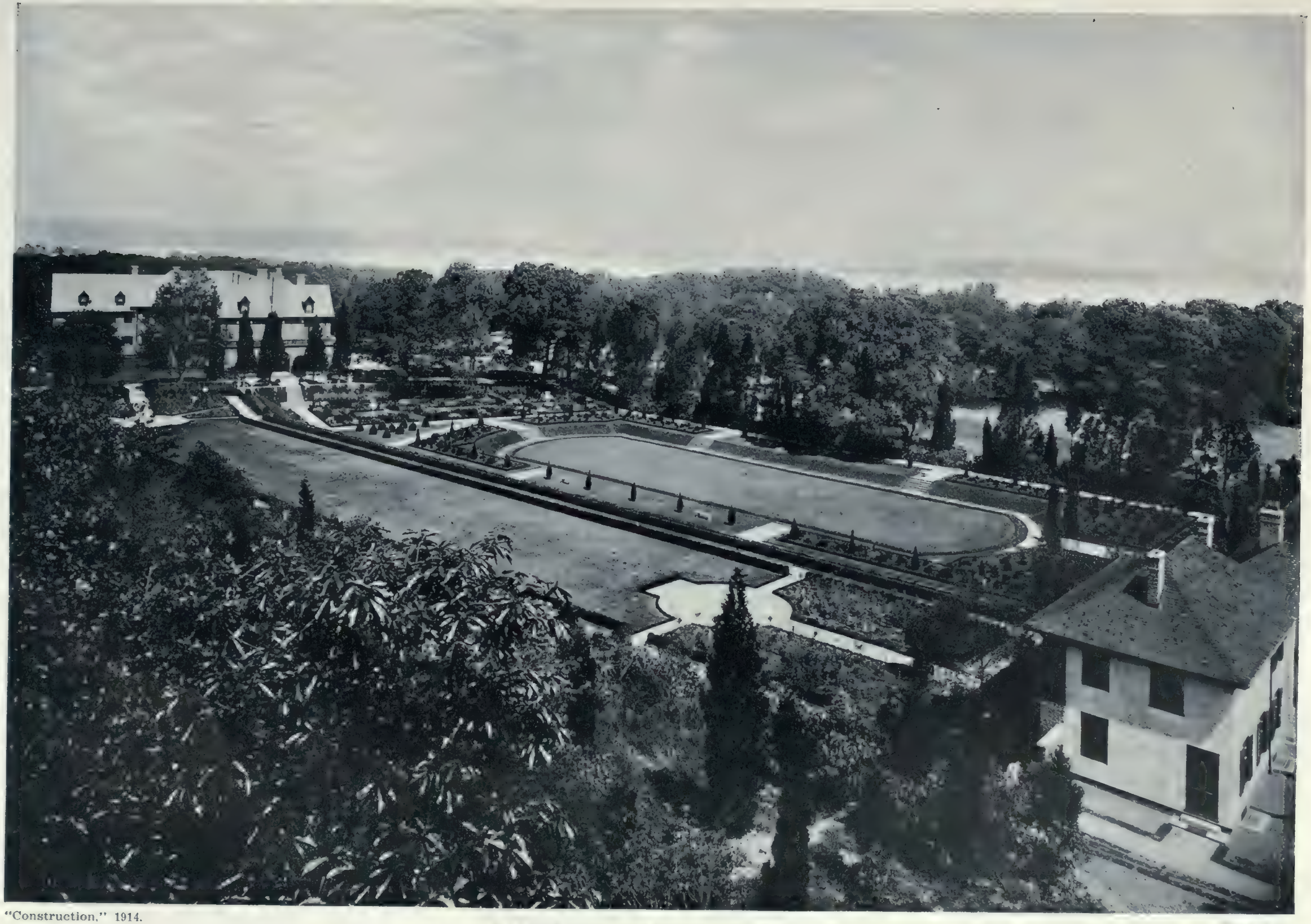
Plate XII.



"Construction," 1914.

ILLUSTRATION OF FORMAL GARDEN.

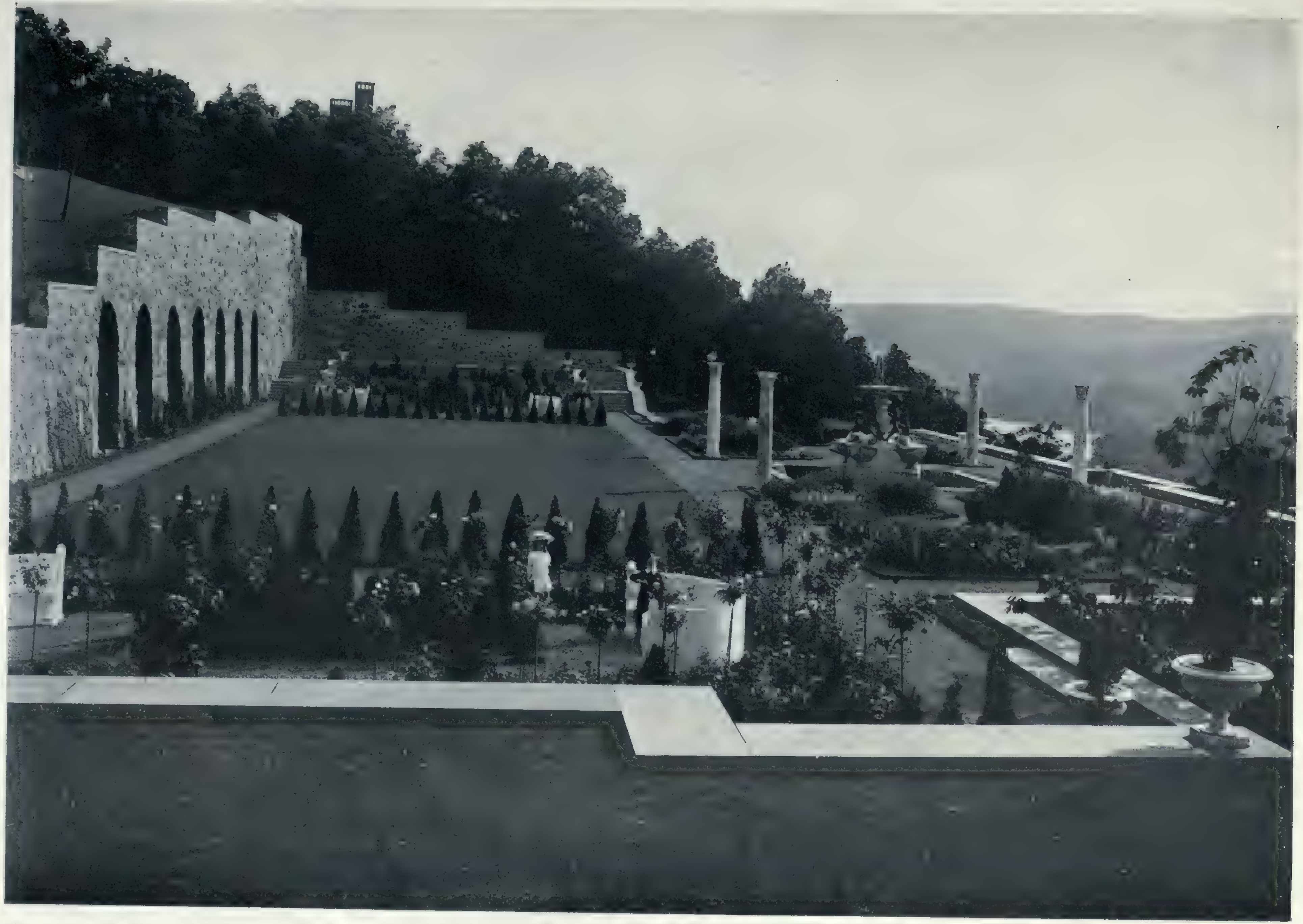
Plate XIII.



"Construction," 1914.

ILLUSTRATION OF FORMAL GARDEN.

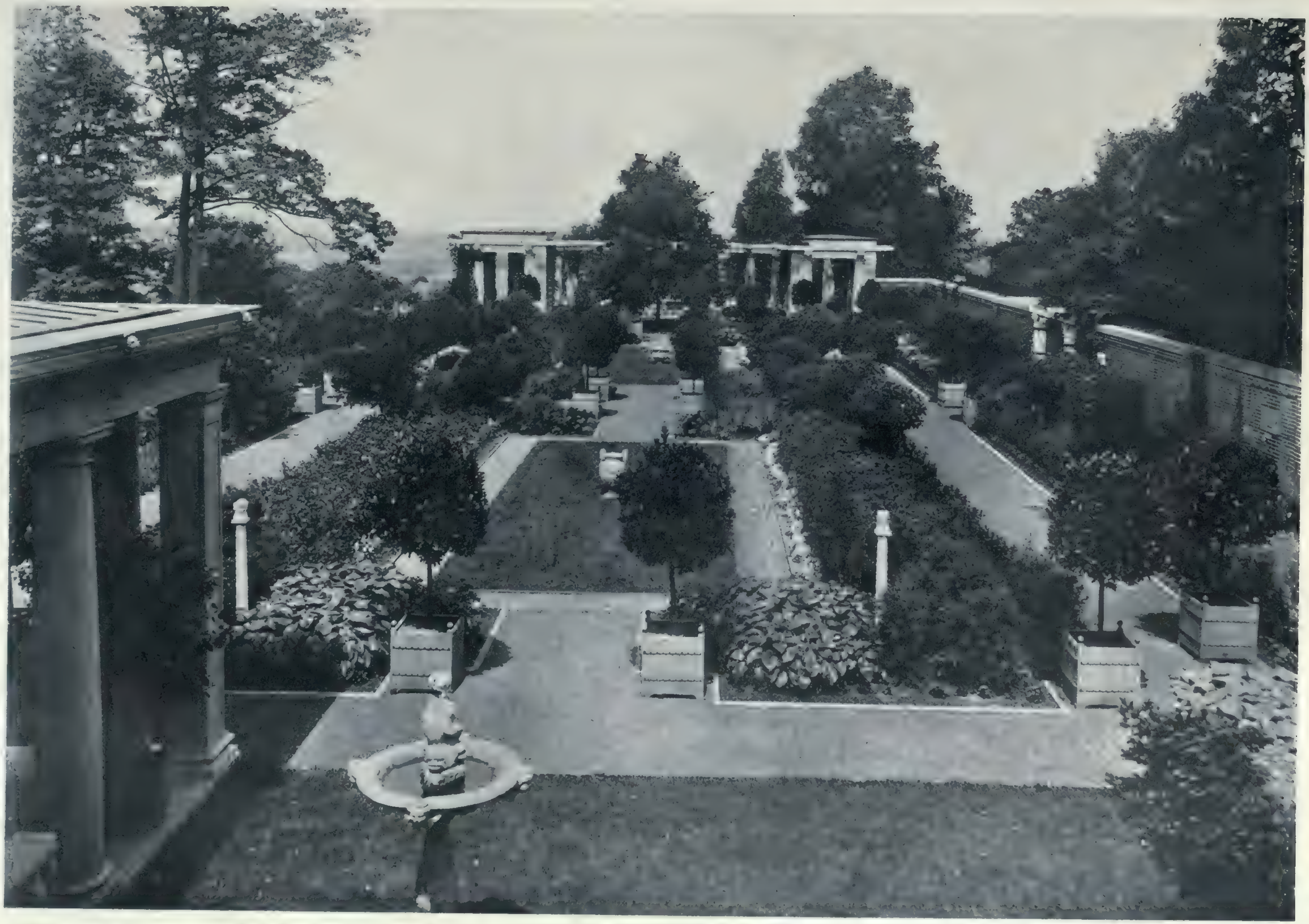
Plate XIV.



"Construction," 1914.

ILLUSTRATION OF FORMAL GARDEN.

Plate XV.



"Construction," 1914.

ILLUSTRATION OF FORMAL GARDEN.

Plate XVI.

CONSTRUCTION

February, 1914 Vol. 7., No. 2

CONTENTS

EDITORIAL 49

Twentieth century in relation to gardening——The quantity system of estimating——Graduated scheme of charges on buildings——Unionization of the architectural profession.

CENTRAL Y.M.C.A., TORONTO 51

FORMAL GARDENS 61

CURRENT TOPICS 73

Montreal's World's Fair for 1917——Building statistics for 1913 throughout Canada——Address upon fire-prevention——Specification for artificial stone.

Full Page Illustrations

ALCAZAR GARDENS, SEVILLE, SPAIN .... Frontispiece

CENTRAL Y.M.C.A., TORONTO .... Plates IX-X

FORMAL GARDENING .... Plates XI-XVI

SUNKEN POOL AT "MARSHCOURT," HAMPSHIRE, ENGLAND.......Page 72

H. GAGNIER, Limited, Publishers
GRAPHIC ARTS BLDG., TORONTO, CANADA

BRANCH OFFICES:
MONTREAL WINNIPEG CHICAGO NEW YORK

GARDEN OF ALCAZAR,
SEVILLE, SPAIN.
Photo by F. R. Major.

EDITORIAL

The rapid growth in gardening—What the twentieth century means to this work—The need of creative genius and far-reaching personality.

IN THIS ISSUE will be found a treatise on formal gardens, belonging to a series of papers, the first one, "Entrances to an Estate," appearing in the August number of last year. The aim of the author is to suggest allowing the architect or the landscape designer to feel the great need of a more thorough understanding of the possibilities before him. The twentieth century is witnessing a Renaissance far reaching in its influence, and which will assemble the illustrious work of the past, eradicate the chaotic conceptions of recent years, and formulate the natural and artificial into one harmonious whole. The desire to provide a suitable setting for the three room bungalow up to the most expensive of homes is prevalent throughout this new country. And the enthusiasm will continue until every section will boast of gardens vieing in charm, grandeur, and extent with the spicy groves of Ecbatana or the Babylon hanging gardens. To accomplish this the sympathetic nature of the designer will comprehend the utmost possibilities of the materials with which he works. He will sense the proper fitness of combinations, blending harmoniously the trees, grass, flowers, water and rocks to the artificial in such a manner as to impress even the most critical with a feeling of contented admiration. Such a result when analyzed will illustrate the genial relationship of form, color and texture. The mind will have grasped the changes necessary, eliminating here and there the growth foreign to its scheme, introducing whatever nature has failed to supply. The work will not only satisfy the present need, but is planned so as to grow more beautiful each succeeding year. And it is safe to assume that if the lay-out is wholesome and practical at the beginning there will be little, if any, cause to worry over the future development. The one essential, therefore, is to comprehend our idea from every standpoint, viewing it in perspective as well as entering into the very existence of its component parts. Let the freedom of nature permeate our every step and then there will be no cramping, no absurd imitations. In doing this the garden will breathe the song of life and the natural along with the creative will bespeak the personality of one who has risen above the limitations of self and enhanced, if possible, the wondrous symphony of nature herself.

The quantity system of estimating a commendable scheme for the elimination of faults detrimental to prompt and disputeless construction of the building.

THE QUANTITY system of estimating is being presented before the architects, contractors and engineers throughout the States in a spirited manner which cannot help but eradicate the unwholesome methods of to-day. G. A. Wright has recently covered an architectural tour on this subject, visiting twenty-seven cities and travelling eleven thousand miles. The aim of the work is to adequately protect the architect, contractor and owner. By adopting some method whereby the exact quantity of materials and labor required is given each bidder, this protection will become an established fact and the building world in general will accrue the benefits derived therefrom. That there is a great need for better ethics is quite evident from the amount of overhead charge made in each contractor's office; from the numerous law suits over the failure of bidders to interpret the drawings and specifications correctly or the architect's omission of certain materials; from the time lost by the various sub-contractors in studying the drawings and endeavoring to eliminate as much as possible the element of chance. That a greater percentage of bankruptcies occurs among contractors than in any other trade leads us to feel that there must be something radically wrong with the present system. As matters stand to-day, the bidder is forced to adopt a defensive attitude since accurate bids are impossible, while the conditions are constantly changing in respect to prices, labor, weather, etc. The contractor makes considerable allowance and if the work progresses naturally and no mistake has been made in the guessing of quantities for the various matreials, the owner unconsciously pays for this improper charge. But who will blame a party for taking such a license when the majority of specifications are capable of a double meaning, or, as often happens, the drawings and specifications are contradictory and too little time given to clarify the differences. Another injustice often arises in capable firms losing the work through the omission of certain items by the successful competitor. Then, too, the incompetent or the dishonest party assumes the responsibility, knowing full well that their bid is too low for first-class work, which can only result in a building loosely put together with inferior materials. To avoid this there is an ever-increasing demand for concerted action upon the part of the architects and contractors. They should adopt some method whereby there could be little, if any, embarrassment to either during the process of construction and which would guarantee the owner full value for his money invested. The quantity system of estimating, which consists in giving each contractor an itemized copy specifying the exact amount of all quantities of materials and labor necessary to complete the work in hand, unquestionably furnishes an admirable solution. The scheme is not new, but has been successfully employed in European countries. In fact at a conference in Great Britain some years ago, a resolution was adopted by the National Federation of Building Trade Employers, the London Master Builders Association, and the Institute of Builders, not to bid unless bills of quantities were supplied at the owner's expense. In England the drawings and specifications are handed to the quantity surveyor, who prepares the quantities and delivers same to all contractors who are invited to bid. By furnishing a list of materials giving amount and concise description of each item, together with a set of the specifications and drawings, little chance arises for disputes. The quantity surveyor, properly trained, acts as arbitrator between contractor and owner, accomplishing the work now assumed by many, saving to all bidders considerable time, and leaving no uncertainty as to what drawings and specifications mean. It is a highly commendable plan and should be adopted in every city of importance.

A graduated schedule of charges on buildings prepared under the direction of the American Institute to be universally adopted in the States.

A COMMITTEE, consisting of Irving K. Pond, R. Clipston Sturgis, and Joseph C. Llewellyn, were appointed by the American Institute of Architects to propose a scale which would classify the buildings and make allowance for varying costs. The great need for this is and has been felt for some time. England has a regular charge of 5 per cent. for all buildings above $12,500, and a graduated scale on all work up to that amount; France also follows certain rules, while Germany possesses a detailed classification of structures to which the graduate system is applied, allowing a higher rate on the artistic than on the structural.

The committee, while recommending a series of minimum charges, still believes that the architect of unusual ability should formulate his own rate in ratio to his larger grasp of the work for which he may be hired. While the efforts of the committee seem to be generally approved, still they were instructed to continue, as a revision at this time would be most inadvisable.

In order to give an expression of the general consensus of opinion as well as the three prominent men on the committee, a table containing the type of building, cost and per cent. is given:

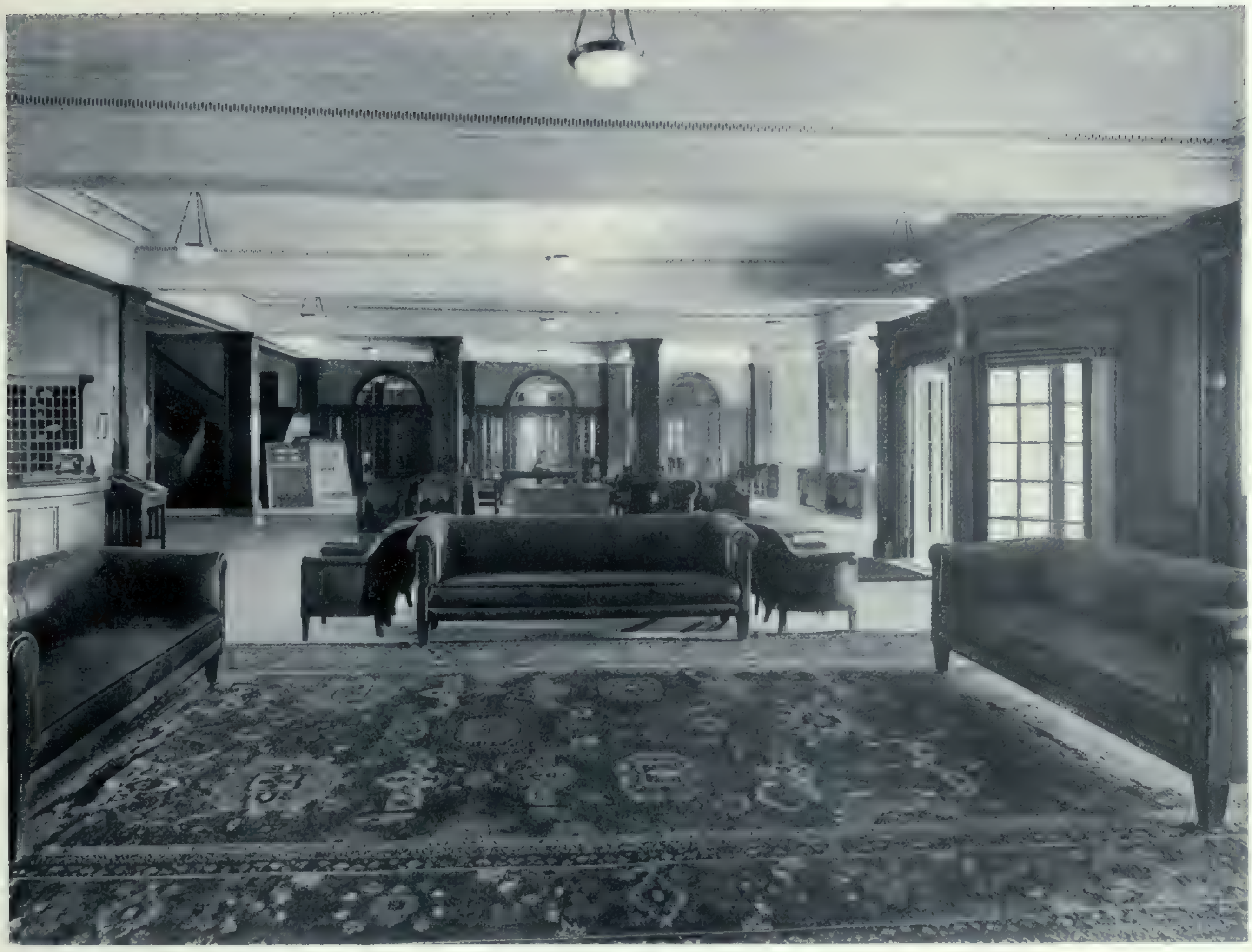
Cost.	Lofts, factories warehouses, power-houses Per Cent.	Public and private work generally Per cent.	Residences*
$20,000	5.5	6.5	7.9
30,000	5.4	6.4	7.8
40,000	5.3	6.3	7.7
50,000	5.2	6.2	7.6
75,000	5.1	6.1	7.5
100,000	5.	6.	7.4
150,000	4.9	5.9	7.3
200,000	4.8	5.8	7.2
250,000	4.7	5.7	7.1
300,000	4.6	5.6	7.
350,000	4.5	5.5	
400,000	4.4	5.4	
450,000	4.3	5.3	
500,000	4.2	5.2	
750,000	4.1	5.1	
1,000,000	4.	5.	

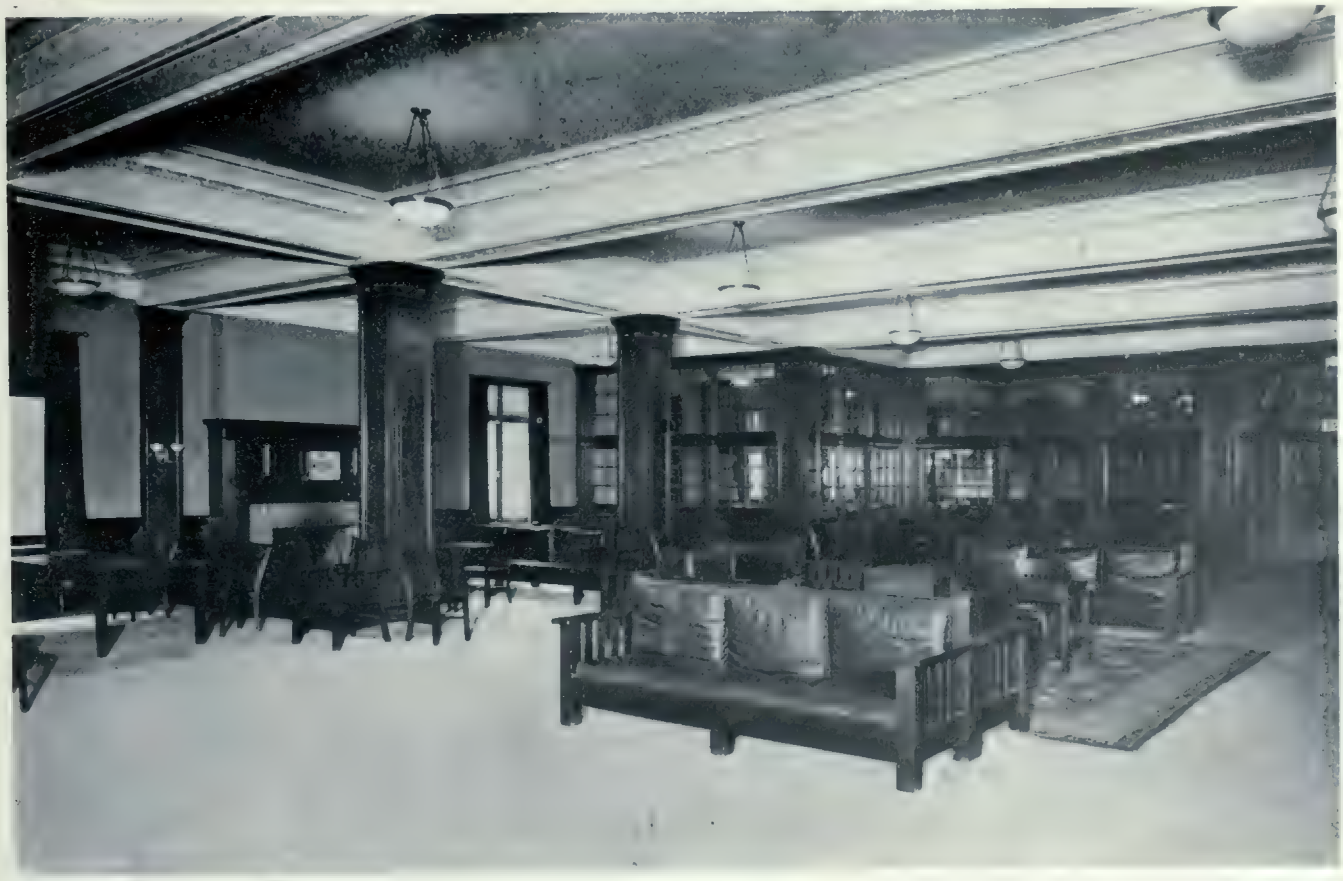
*Residences of 10,000 or under, 8 per cent.

For monuments, fixtures, furniture, etc., the charge graduates from 20 per cent. on $100 to 12 per cent. on $7,500. The division of the total fee in relation to the various services rendered with corresponding values in the tenths of the total fee are: Preliminary studies, .15; working drawings, .35; full size details, .05; specifications, .15; contracts, supervision and auditing accounts, .3.

What the unionization of the architectural profession would mean to the moral attitude of its members and the position it holds among the people.

THE GREAT centralizing spirit of the architectural profession is revealing itself as never before. The reception offered in England to an atelier with a direct French influence after the Beaux Arts methods is highly commendable; the interchange of architectural lectures among certain institutions and the accepted invitation of a local architect to deliver a paper before the R.I.B.A. cannot help but augur well for the unionization of this phase of art. The American Institute of Architects for the first time in its history selected a southern city, New Orleans, for its convention. That such a friendly relationship and interest in the work of others is growing will undoubtedly place the personnel of the profession on a higher plane. This in turn will help eradicate the existing evils within and produce a standing of each member above and beyond the just censure which prevails at the present time. It is not a pleasing sensation to have men continually citing instances of personal greed which not only belittles the architect himself, but also reflects discredit upon the whole institution. Such a condition is of the gravest importance and should receive its death knell before the fever for a few paltry dollars corrupts the morals of those whom we know are free from these dishonest methods.

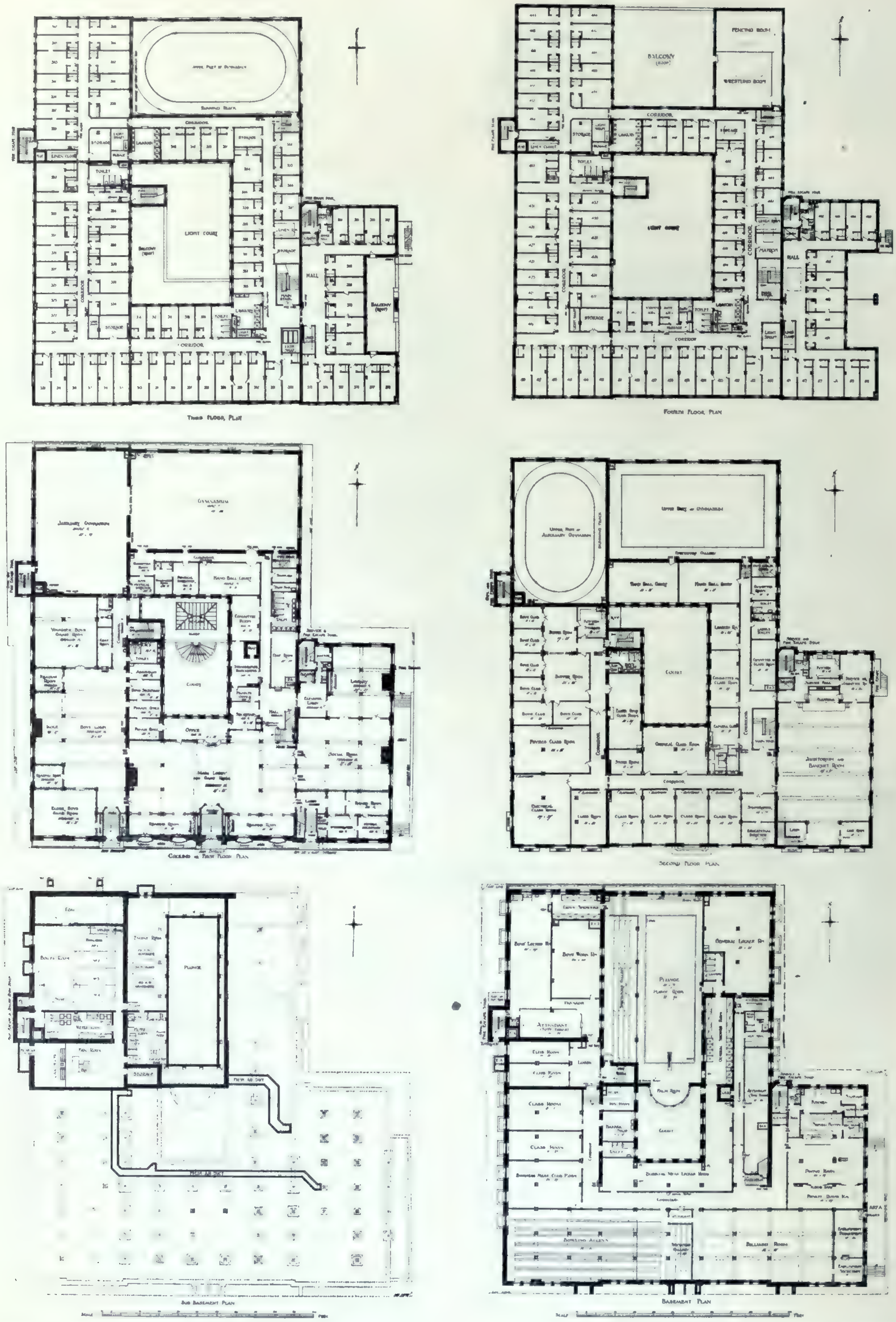




MAIN LOBBY.
BOYS' LOBBY.

CENTRAL Y.M.C.A., TORONTO.

BURKE, HORWOOD & WHITE,
ARCHITECTS.



Third Floor Plan

Fourth Floor Plan

Ground or First Floor Plan

Second Floor Plan

Sub Basement Plan

Basement Plan

BURKE, HORWOOD & WHITE,
ARCHITECTS.

CENTRAL Y.M.C.A., TORONTO.

WILLIAMS & COLE,
ENGINEERS.

Central Y. M. C. A. Building, Toronto

W. H. RATCLIFFE

THE PROBLEM presented in the designing of a Young Men's Christian Association Building is a very complex one. Unlike the majority of other buildings, it must contain within its walls, several distinct features, each of which would ordinarily form an organization of its own, such as the social club, athletic club, school, lodging house and restaurant, as well as the various smaller departments that go to make up the modern Y.M.C.A. While the main work of the Y.M.C.A. is among men, yet many of these departments must be duplicated for the boys and arranged in such a manner that both branches may be carried on without any interference with each other and still be under the one mangement.

Such a problem has been very successfully solved in the design and construction of the new Central Y.M.C.A. Building. While the Association is for the central portion of the city and is near the business heart, yet it is far enough removed to be free from its noise and tumult. The site is ideal, located as it is on the north side of College street near Yonge street, overlooking the beautiful grounds of the Bishop Strachan School for girls. The lot has a frontage of 204 feet on College street and extends through to Grenville street a depth of 208 feet, with a frontage on Grenville of 156 feet. The building itself is 186 feet wide by 202 feet in depth and is designed in the Georgian style, built of red brick with wide white mortar joints and trimmed in grey stone. The appearance of the building readily suggests to the passerby the nature of the work carried on within its walls. The main entrance, flanged by large Doric stone columns, is in the centre of the front on College street, and while massive in appearance, for the treatment extends to the fourth floor, yet it is quiet and gives the impression of the welcome that awaits one on the inside. The entrance opens into a large vestibule with marble steps and wainscot and walls of tinted panelled plaster. From this, one enters into the main lobby, a spacious room 37 by 86 feet, paved with terrazzo floor and finished with quarter-cut oak dado and columns and plaster beams and cornice. The walls are decorated in a rich olive green. Opening directly from this, and separated only by a low railing, are two reading rooms, each 10 by 34 feet, well equipped with writing desks and large reading tables, bookcases, and racks for current newspapers. The main office is separated from the main lobby by a low railing and counter only. This is a new departure in Y.M.C.A. planning, as it leaves the secretaries of the various departments in constant touch with the members and strangers. In connection with this office is a battery of private post office boxes for those rooming in the building. A very complete telephone system has been installed, with private switchboards connecting the one hundred and eighty telephones in the various offices and dormitory rooms with each other or the six trunk lines for outside service.

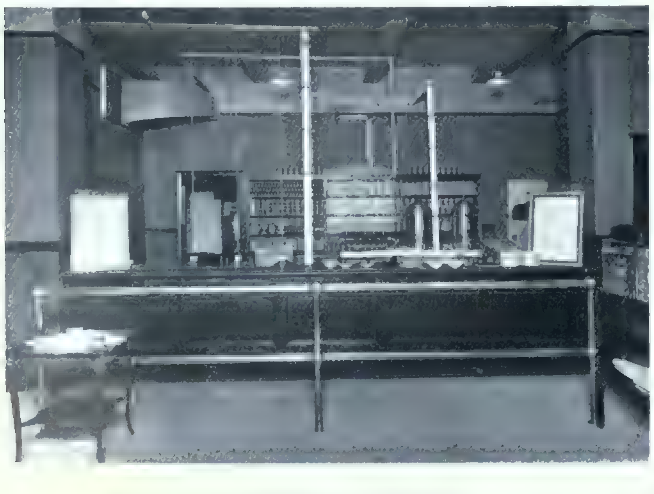
EAST ENTRANCE TO BOARD ROOM.

In the front portion of the eastern section is located the offices of the general secretary and the board room. Directly behind them and opening off the main lobby is a social room 37

BILLIARD ROOM.

by 48 feet, furnished with easy chairs and divans, where quiet conversations or small social gatherings may be held. Behind this again is the library, 29 by 37 feet, with built-in bookcase and splendid facilities for study or reading. The social room and library are decorated in a deep terra cotta color.

In the western section is located the boys' lobby, with game and reading rooms opening off. All of these larger rooms have the same treatment as the main lobby, a very attractive feature being fireplaces built of brick with overmantels of quarter-cut oak in the Georgian style, which give a most hospitable and homelike feeling. Connected with both the main and boys' lobbies are large coat rooms.



CAFETERIA COUNTER.

The rear portion of the first floor is devoted to the athletic department, containing the men's and boys' gymnasiums and the physical director's offices and examination room. The main gymnasium is 50 by 86 feet and extends through three storys of the building, having a spectators' gallery at the second floor and running track at the third floor level. This track is banked for speed, and contains twenty-six laps to the mile. The boys' or auxiliary gymnasium is 47 by 74 feet, and extends through two storys, with running track at the second floor level. Both gymnasiums are lined with buff pressed brick and floored in maple, making very bright rooms. Between these is an opening 15 feet wide protected by an automatic rolling steel shutter, which is kept closed except when desirable to use both rooms as one. Each gymnasium is served by four separate stairs from the showers, etc., below or to the running tracks above. One feature of the work, and one that proves to be very attractive, for it is almost

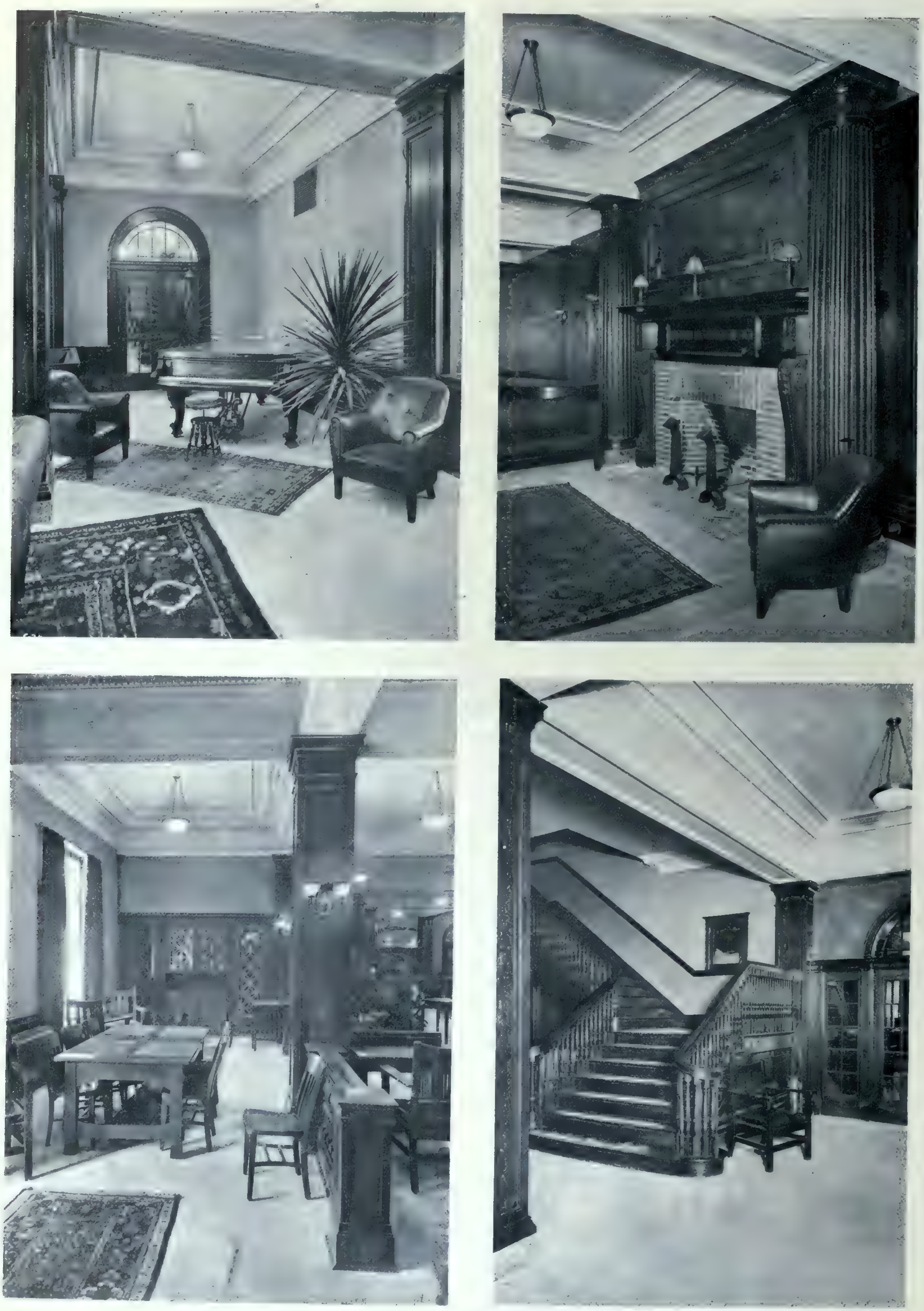
DETAIL OF PLUNGE ROOM.

constantly used, is the game of hand ball. There are three large rooms devoted to this, one being on the first floor and two on the second floor. These rooms are floored in maple and plastered in cement with Keene's cement finish. All the walls are finished absolutely flush, as any projection, even a door knob, hinders the game.

In the rear of the basement are located the various locker rooms, shower rooms and the plunge, the business men, young men and boys having their own locker rooms, which are finished in cement stucco walls and concrete floors, with a hard surfaced finish. Each contains about three hundred lockers, the business men having private ones, while the young men and boys have individual tote boxes 8 x 8 x 10 inches, in which they place their gymnasium clothes. Thes are stored in the attendant's room on steel shelving, where the members call and, on presenting their membership tickets, receive their boxes and take any available locker. As it is compulsory for each man to take a shower bath before he enters the plunge, the shower rooms have been arranged so that it is necessary to pass through them to reach the plunge. The business men and young men use the same room, which contains twenty-six showers, one of which is a needle bath. The shower partitions and backs are of marble, while the floor and walls are of tile. The boys' room contains fourteen showers in two large open stalls.

Separated by a wire screen from the plunge room, which has tile walls and floor, is a spectators' gallery with banked seats accommodating two hundred persons. The plunge proper is twenty-five feet wide and seventy-five feet long, built of concrete with tile lining. In the walls and floor are marked with darker tile the various

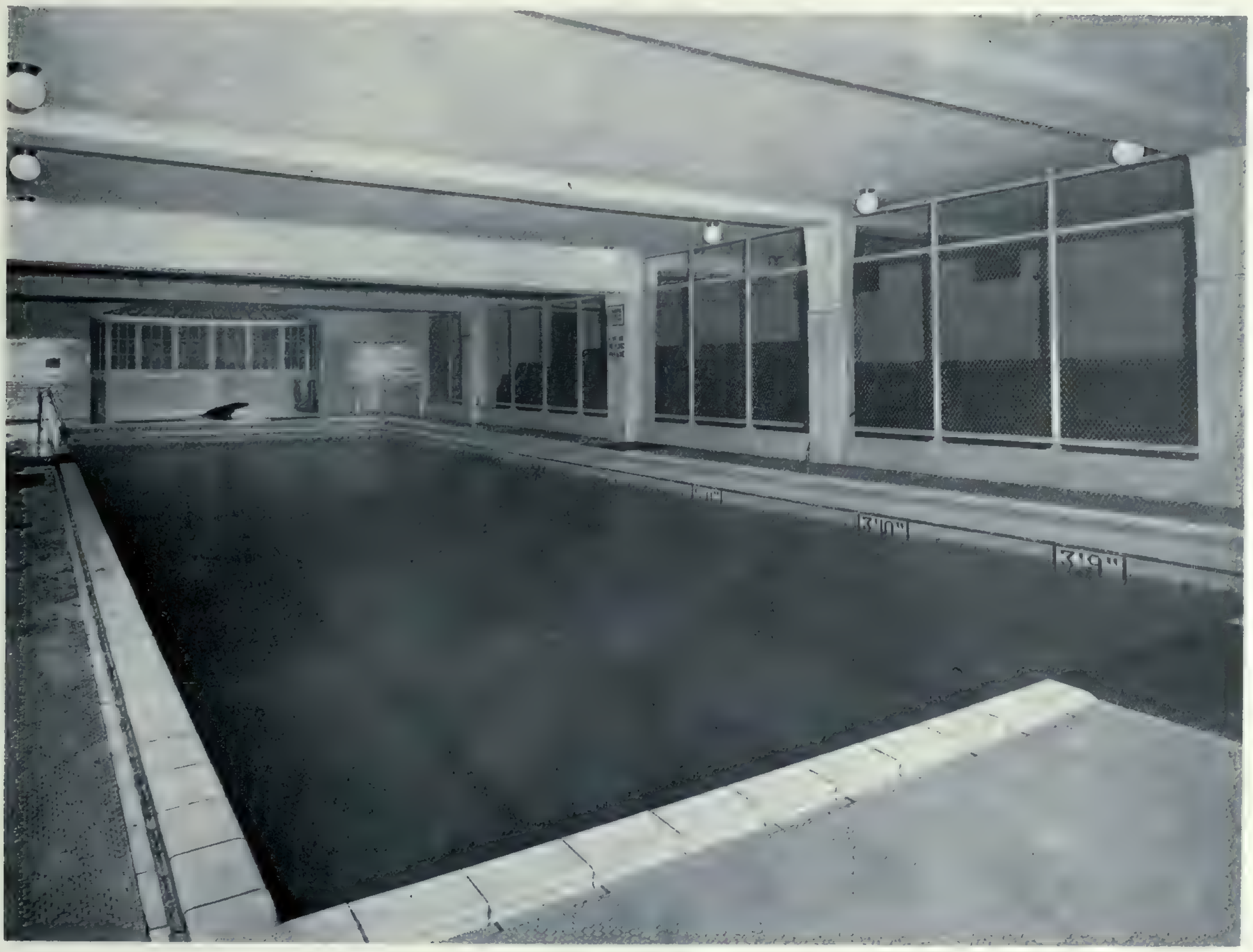
BOWLING ALLEYS.



MUSIC LOBBY
WRITING SPACE.

DETAILS OF MAIN LOBBY.
CENTRAL Y.M.C.A., TORONTO.

FIREPLACE.
MAIN STAIRS.



PLUNGE ROOM.

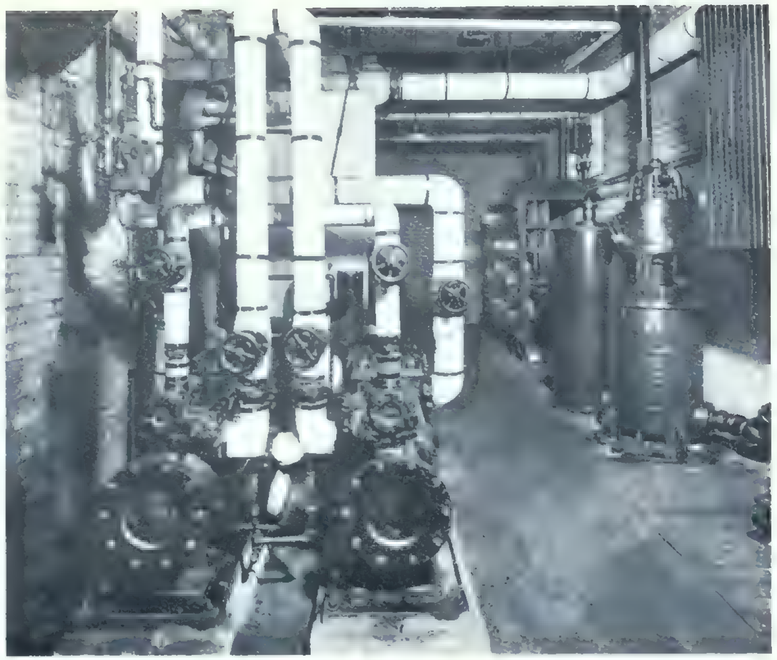
depths of water, swimming lines and diving distances.

In the front portion of the basement are located five regulation bowling alleys, the billiard room, with four pool and three English billiard tables, and the employment department, which has a separate entrance on the east. thus isolating it from the rest of the building. Directly behind the billiard room and employment department is the dining room with its serving room, kitchen, storage, refrigerator and dish washing room. The dining room will accommodate ninety, and the self-serving system has been adopted. In the western section are located various class and club rooms, a toilet, barber shop, and a drying room for the clothes in the tote boxes.

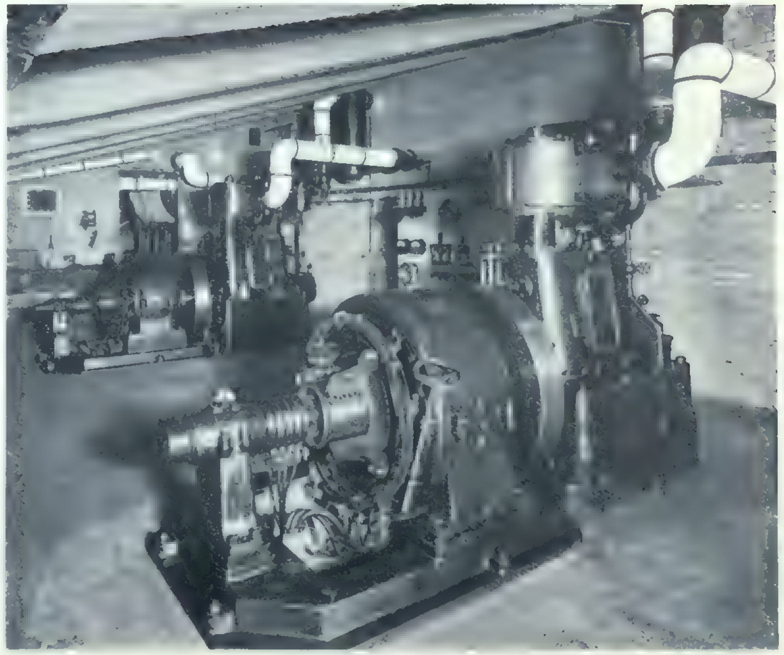
The sub-basement, in which is located the large power plant necessary for a building of this type, is about one hundred feet square, and

BOYS' SHOWER.

GENERAL SHOWER ROOM.



PUMP
ROOM.

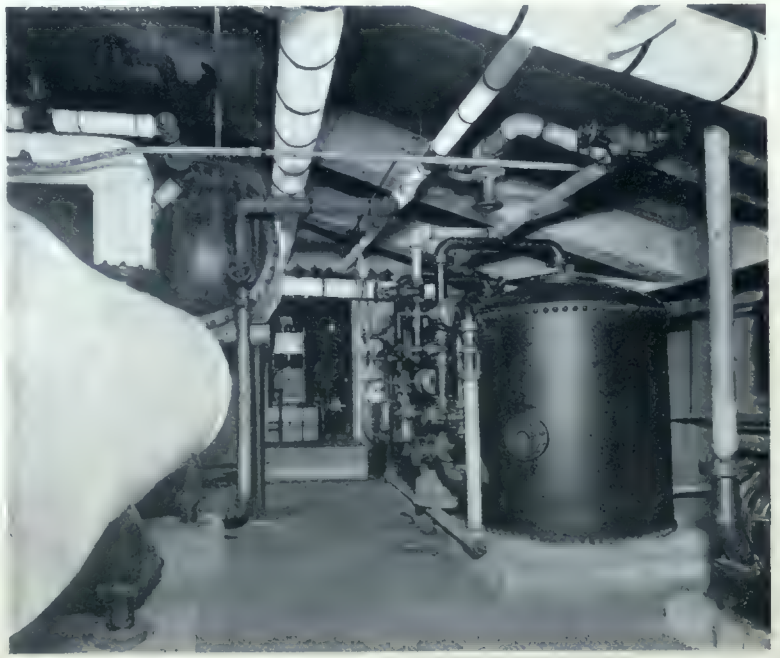


ENGINE
ROOM.

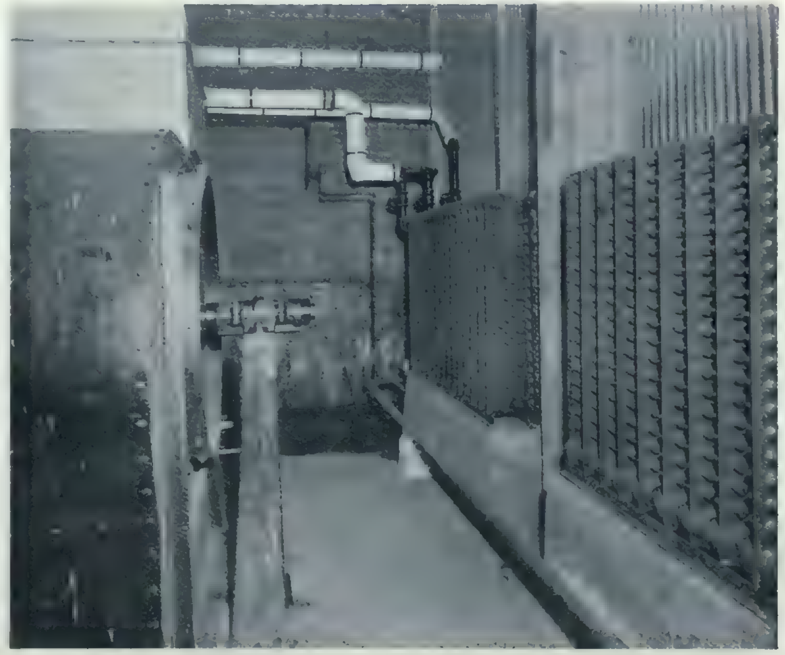
MECHANICAL EQUIPMENT,
CENTRAL Y.M.C.A.,
TORONTO.

BURKE, HORWOOD & WHITE,
ARCHITECTS.

WILLIAMS & COLE,
ENGINEERS.



FILTER
ROOM.



SUPPLY
FAN ROOM.

MAIN GYMNASIUM.

is sub-divided into the various fan, pump, filter, generator and boiler rooms. This power plant is the subject of a separate article in this issue.

The second floor is devoted mainly to the class rooms, boys' club room and the auditorium. The class rooms are light and airy. The boys' club rooms are arranged in a very interesting manner on two sides of a large supper room, being separated only by a glass screen, the doors of which may be thrown open when required for a large supper. This supper room has its own kitchen in connection with it.

The auditorium is a room 47 feet wide by 61 feet long, with a seating capacity of six hundred. It is treated in a very simple though interesting manner with circular headed windows and plaster pilasters supporting the beams above. It is decorated in grey tones, giving a very quiet and dignified appearance. Here may be held large banquets, served from a kitchen and serving room in the rear. Located also on this floor is the camera club, with separate developing and enlarging rooms.

The third and fourth floors are devoted entirely to bedrooms, of which there are 157, some of them being double, giving accommodation to about 180 men. These rooms are very attractive, being decorated in delicate tones. Each is furnished complete and equipped with a telephone. On each of the dormitory floors are located two toilets and shower rooms finished in marble and tile. A passenger elevator gives service to all floors in the building.

The building is divided into five distinct fire zones, separated from each other by brick walls and fire doors. The first floor is of fireproof construction, while the other floors are of wood supported by steel. The completed structure cost about 18c. per cubic foot.

The architects of this building also designed the two branch buildings, one on Broadview

BOILER ROOM.

avenue and the other at the corner of College street and Dovercourt road.

MECHANICAL EQUIPMENT.

Williams & Cole, Engineers.

In the general arrangement and type of the mechanical equipment the Central Y.M.C.A. Building of Toronto ranks favorably with the best equipped structures of its kind in America. The sub-basement is given up entirely to the mechanical works, and consists of boiler and engine rooms, coal pit, meter and fan rooms, plunge, filter room, and storage.

The private power plant generates all the heat, light and power necessary for the entire building. A complete system of ventilation of the blower type has been installed, with adequate supply and exhaust blowers; high pressure steam is provided for the kitchen and serving apparatus, in addition to a thoroughly practical and up-to-date filtering, heating and circulating system for the swimming pool. The boiler room is equipped with four 125 H.P. horizontal return tubular steam boilers fitted with quick closing water gauge cocks, self closing tri-cocks with chain levers operating from the floor. Two vertical high speed engines have also been installed, of a direct-current compound wound type, three wire dynamos with balancing coils, which generate electric current for the entire building—250 volts for power and 125 volts for lighting.

The exhaust steam from the engines, taken through an oil separater to the low heating system, heats the open feed water heater, filter and purifier, the hot water generators for shower baths, domestic service and swimming pool. The boilers supply steam to the engines at 125 pounds pressure. In the kitchens and other domestic service quarters live steam reduced to 40 pounds is used, while an auxiliary live steam connection is taken from the boilers to the low pressure piping system through a balanced pressure vacuum regulating valve.

The heating apparatus is equipped with the vacuum system, and the water of condensation is drained into a receiving tank at the low point, from which is connected the suction of a 10 x 12 x 16 vacuum pump. The pump discharges into a separating tank on the ceiling of the pump room, from where the condensation flows to the feed water heater by gravity.

The boilers are blown off under pressure to a 42 by 108 inch blow-off tank on ceiling of boiler room, which drains by gravity to the sump well, provided with an automatic electric bilge pump, discharging to the sewer.

The water in the swimming pool is circulated by means of a centrifugal pump, which draws from one end of the pool and discharges through filters and an instantaneous hot water generator into the opposite end of the pool. In this way the water is kept pure and tempered. A hot water meter is connected into this line to measure the flow, which is estimated at 1,200 gals. per hour, maintaining a temperature of 72 degrees in the pool.

In the sub-basement is installed a supply blower, which draws fresh air from outside, through air filters and tempering coils, supplying the main lobbies, banquet hall, gymnasiums, natatorium and main auditorium through galanized iron ducts. The capacity of this fan is 20,000 cu. ft. per minute.

The exhaust blowers are located in pent houses on the roof. There are four of these, exhausting a total of 25,000 cu. ft. per minute from the toilets, locker rooms, natatorium, kitchens, serving rooms, auditorium and shower bath rooms. These are all slow speed fans, direct-connected to motors with speed-regulating rheostats. The pipe covering is 85 per cent. magnesia and asbestos air cell sectional covering.

THERE are certain fundamental principles that must be wrought into the plans of a modern Association building.

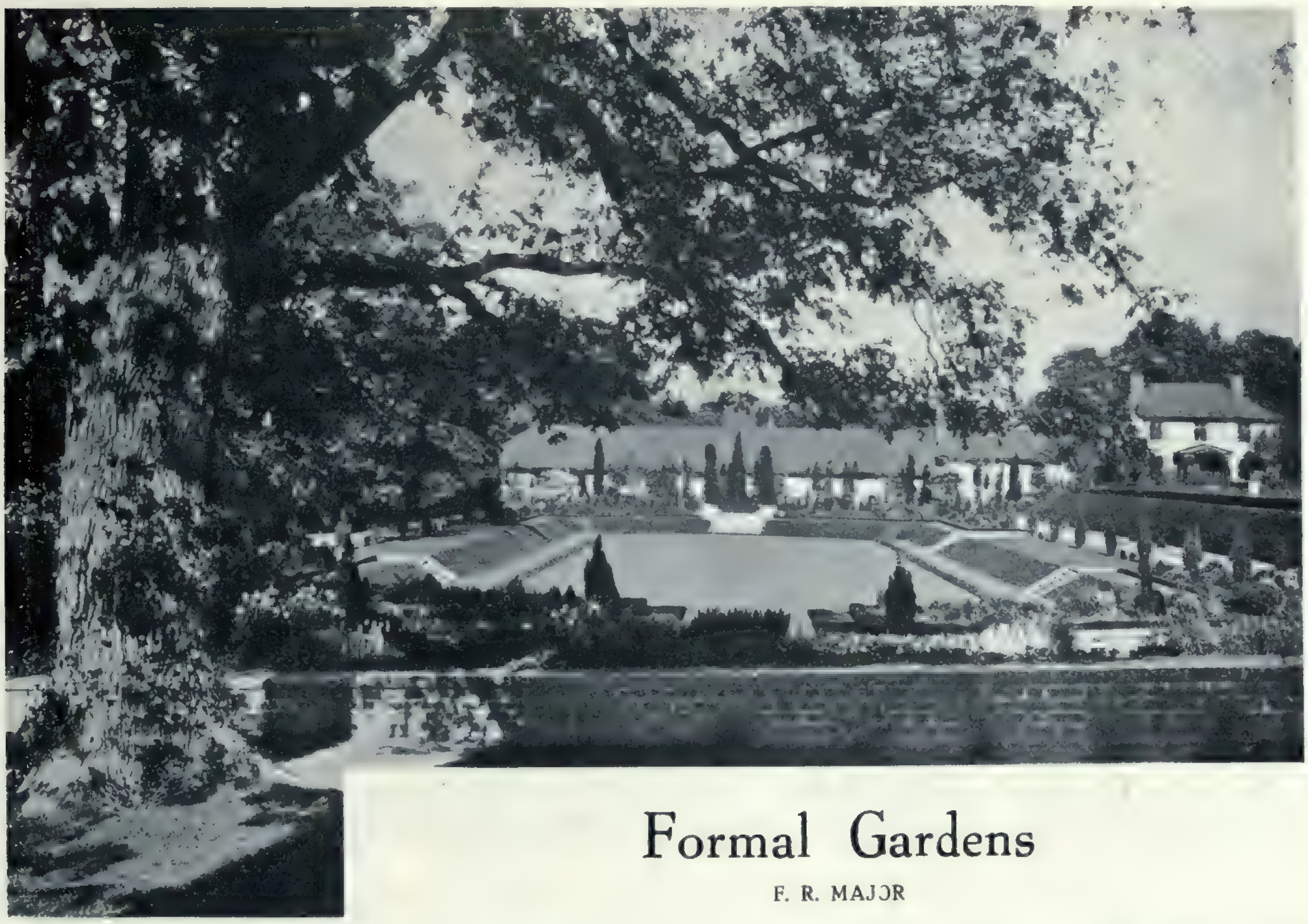
1st. *It must be inviting, convenient and comfortable.* The Association is a leisure-hour institution to which men and boys feel no obligation to come unless attracted by the fellowship and activities of the place. If the building of the Association be uninviting or ill suited to its intended activities, the Association will lose its constituency to competing leisure-hour attractions of less helpful influence.

2nd. *It must have considerable revenue-producing capacity.* It is the common purpose of Y.M.C.A.'s to keep down to the minimum the cost of the privileges to members so as to make them accessible to the maximum number.

3rd. *It must be capable of economical maintenance and control.* An Association is used day and night for varied purposes by a considerable number of people, and consequently must be able to stand rather hard usage. It is also true that the fees charged users are always scaled lower than the cost of operation. These two facts make it necessary to so plan and construct the building that a minimum current expense shall be incurred in repairs and maintenance, in janitor service and in supervisory force for the proper control of activities.

4th. *It must be so designed and constructed as to facilitate internal remodeling and rearrangement of rooms for changing uses, also the attachment of additions or annexes.*

The variety of features conducted by an Association makes it expedient that the adaptation of the work to current needs may not be hampered by fixity of the building arrangement and equipment.—W. M. Wood.



Formal Gardens

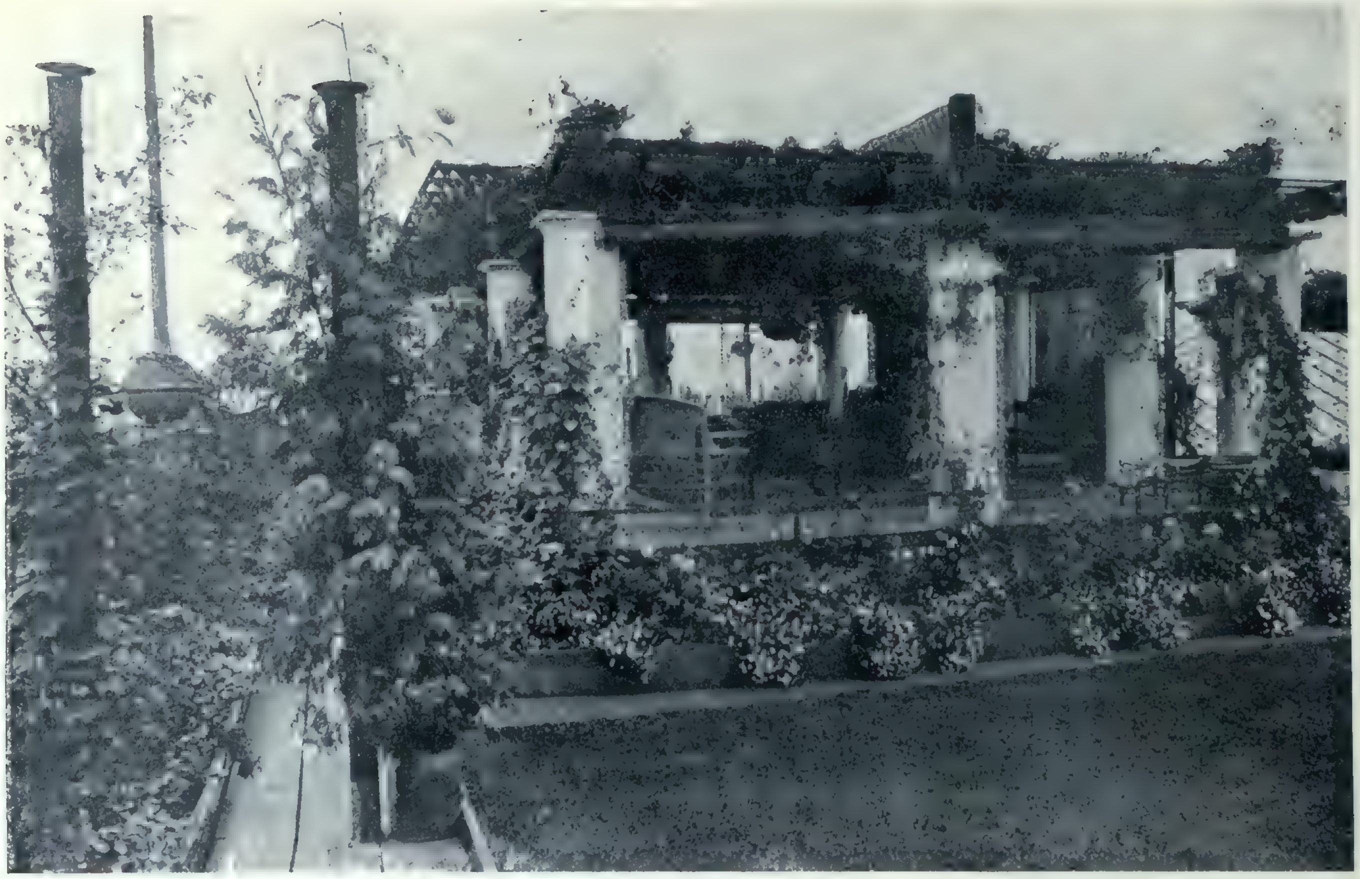
F. R. MAJOR

THE MODERN GARDEN is in an embryonic state, capable of wonderful possibilities if based upon a wide knowledge of past masters and a keen appreciation of the present conditions and future needs. By this we do not mean that gardening is a new art, but rather, that our climatic conditions, diversity of people, and natural surroundings are so varied as to require a new individual treatment of each problem presented. Our life tends to formalism. It demands that the units be symmetrical, decorative and co-ordinated. Each tree, planting, path, lawn or hedge must fit into the ensemble so as to produce an æsthetic feeling of grace and at the same time correlate the individual units into one frank, harmonious plan.

The skill of gardening dates back to the Roman and Norman eras, although our best and most adequate accounts of early work are contained in the existing illuminated manuscripts of the monastic orders. These mediæval scholars held to a certain formality, although the natural foliage was interspersed with hedges and adorned with flower beds of all patterns, arbors, seats, etc. It is remarkable how the monks invariably selected the spot most conducive to beauty and grandeur. With an ideal site they erected their abbeys, keeping in mind all the time the relationship of the materialistic to the natural and gaining added charm by the combining of buildings, hills, rivers, trees, gardens, etc., into a perfect symmetry.

From the Middle ages to the present time, garden design has had a varied experience. During the Tudor period it took new life, and after the War of the Roses, English work advanced, under the influence of the Italian, French and Dutch. The revival of classic architecture during the Renaissance lent an added impetus to the gardening, and under the direction of Inigo Jones the yoke of artificiality was thrown off and through his intimate knowledge of the neoclassic style in Italy a fitting revival spread throughout the country. The French style was encouraged by Charles II, who brought le Notre to instruct the English gardeners on the broad lines by which he produced the admirable plan at Versailles. While in England le Notre extended himself as much as possible in the parks of St. James and Greenwich. The Dutch held sway under William and Mary, destroying the restful simplicity of the previous work and encouraging an extravagant use of topiary. Through all these years when foreign invasion was rampant, and of all nations the Italian influence was the strongest, we find the classic development prevalent without the warmth found in the other countries. It was not these influences which created the living charm to be found in English gardens, but rather the restfulness of the lawns and the peaceful arrangement of the flowers—homeliness and grace instead of grandeur and ornateness.

The architect of yesterday grasped the broad



ROOF GARDEN ON HOTEL, FIRST HALF.

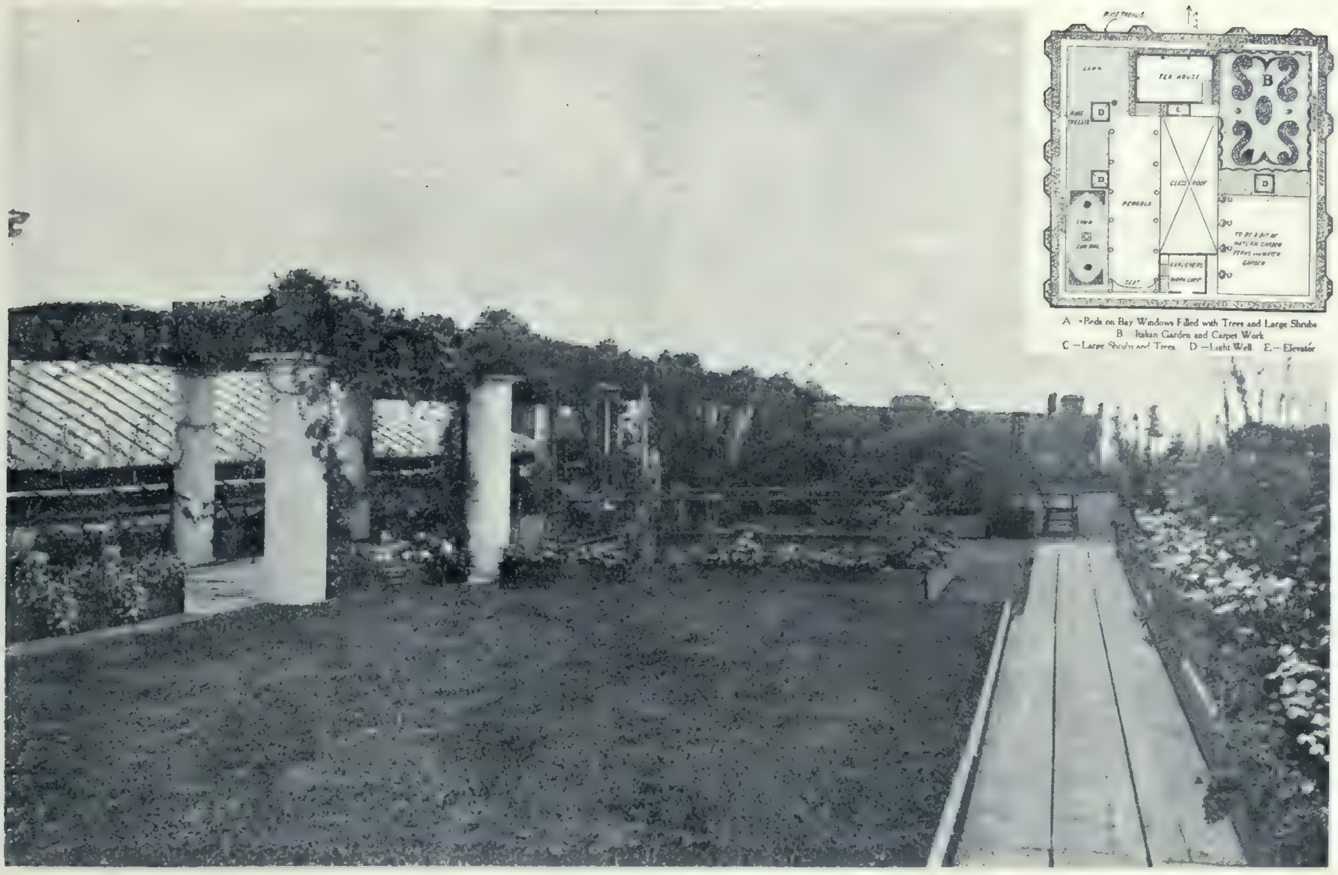
principles which resulted in a ready solution of all problems. While his work is open to criticism, it behooves us to have a care or else we will throw ourselves open to even more severe censure. The man who grasps a comprehensive scheme and is able to carry it through with consistency will be a potent factor in the eradication of the non-homogeneous efforts of our present age. We have such men, but the country demands that every home designer possess the ability to master the details so indispensable to the whole treatment. He must be imaginative and creative with an intuitive knowledge of just how his carefully thought-out plan will look when completed.

What better plan could the architect adopt than to consider the house with its homeliness within and its charm without as his "Castle in Spain." He might benefit by spending some little time in musing over the problem at hand just as Richard le Gallienne did when he depicted the following dream of his ideal home:

"I should need volumes in folio adequately to describe my Castle in Spain, and at least three of them would be needed to tell about my garden. Ah! what a garden there would be in my Castle in Spain! Perhaps, aside from other fancies which I should expect to indulge, there would only be three on which I would really set my heart: a garden, a library, a private chapel.

"I should not hope, nor even could I wish, to be original in my garden; for man's early desire of gardens had developed into a learned convoluted art even before Solomon wrote: 'A garden inclosed is my sister, my spouse; a spring shut up, a fountain sealed. Thy plants are an orchard of pomegranates, with pleasant fruits; camphire, with spikenard; spikenard, with saffron; calamus and cinnamon, with all trees of frankincense; myrrh and aloes, with all the chief spices. A fountain of gardens, a well of living waters, and streams from Lebanon. Awake, O north wind, and come thou south; blow upon my garden, that the spices thereof may flow out.'

"My garden would, first of all, be


ROSE TRELLIS
LAWN
TEA HOUSE
B
D
E
ROSE TRELLIS
GLASS ROOF
PERGOLA
LAWN
SUN DIAL
SEAT
GARDENERS WORK SHOP
TO BE A BIT OF NATURAL GARDEN FERNS AND WATER GARDEN
A —Beds on Bay Windows Filled with Trees and Large Shrubs
B —Italian Garden and Carpet Work
C —Large Shrubs and Trees. D —Light Well E.—Elevator

ROOF GARDEN ON HOTEL, SECOND HALF.

made of dew; next of grass, and then of very old trees. Oak-trees, poplars, and beeches would dominate my garden; and as for the other trees, they would all be trees of veritably *living* green—chestnuts and sycamores and willows. Nothing but freshness and sap and leafage of transparent emerald would be trees in my garden; and the flowers of my garden would be all spring and summer: snowdrop, crocus, and daffodil; violet, rose, and honeysuckle.

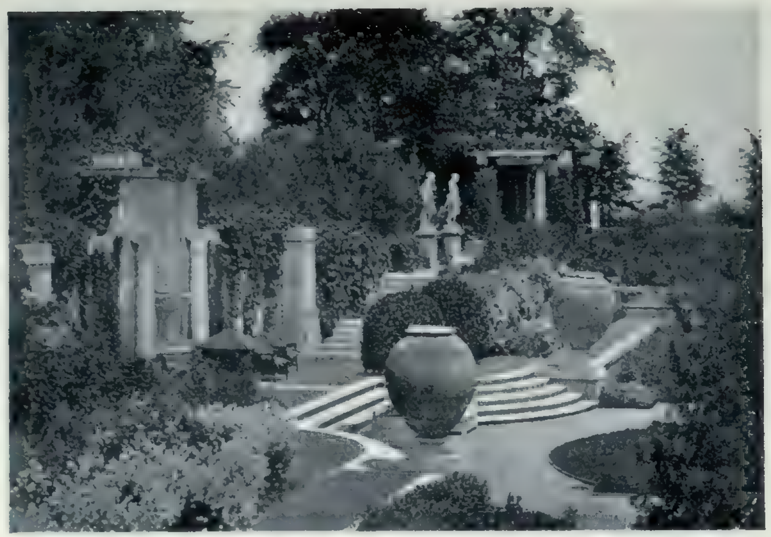
"Here are but, so to say, the first principles of my garden. As I said, it would take volumes in folio adequately to tell about it. But this much further I may say: that among the many divisions and sub-divisions of my garden, there would be three. First, there would be my star garden. In this would be planted flowers that only bloom under the influence of the stars; flowers that open at the setting of the moon, and close with the rising of the morning star. For these flowers I should build a high hanging garden dizzily thrust up into the sky, on the summit of some cloud-encircled turret of my castle. The flowers in this garden would be whiter than snow and purer than my first love. Then there would be my sun garden. In this would be planted the warm-breathed, earth colored flowers, the yellow, scarlet, flowers, the purple and saffron, the orange and crimson—all the hot and savage flowers of the sun. And again, there would be my moon garden—a subterranean realm of pale leaves and ghostly flowers, a dim garden of excavated terraces descending beneath the dungeoned foundations of my castle, irrigated from its green-mantled moat, and fed through slanting shafts of hollowed stone with the surreptitious light of the moon.

"I should allow but few birds in my garden. The eagle should nest, if it would, on some crag-like corner of my battlements, and the hawk would be welcome to soar and swoop about my towers. Only the simple sincere-throated birds should sing in my garden: the thrush and the blackbird and the robin; the starling with his simple-minded whistle, the curlew with his lost,

ILLUSTRATIONS

TO ARTICLE ON

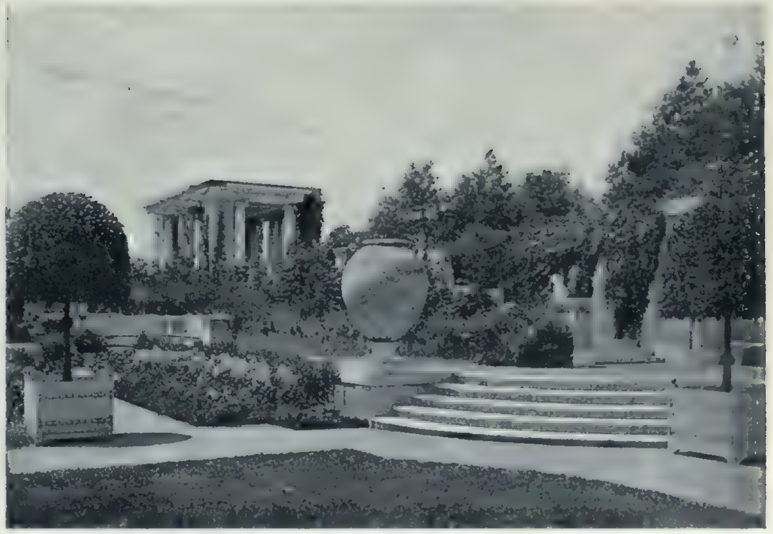
FORMAL GARDENS.

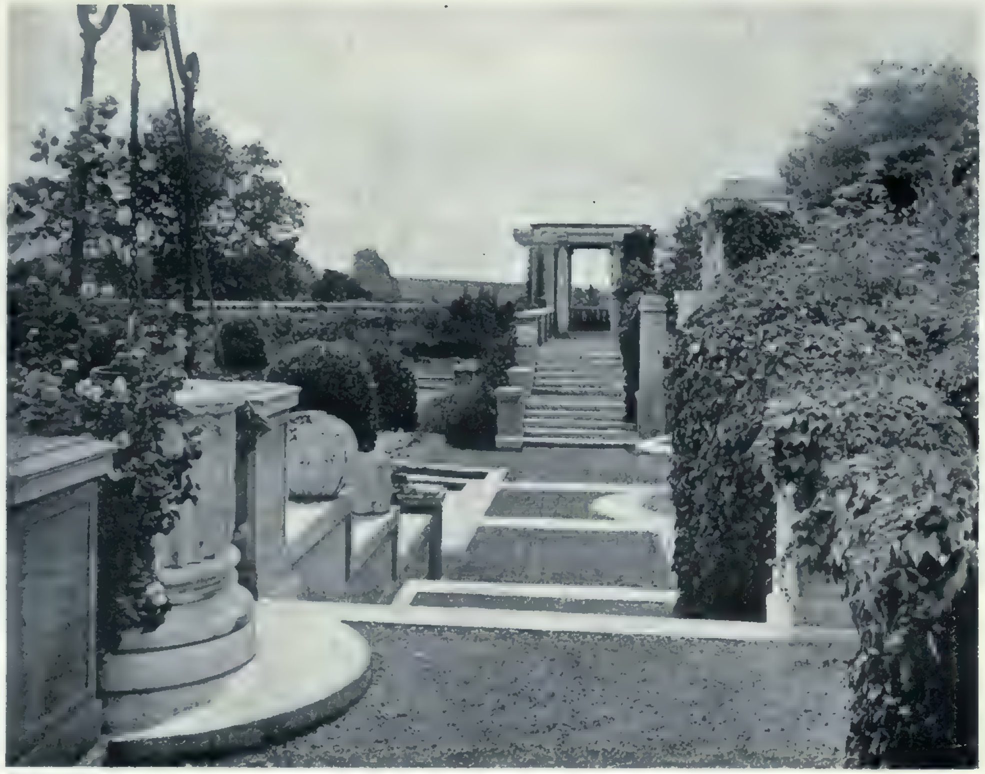


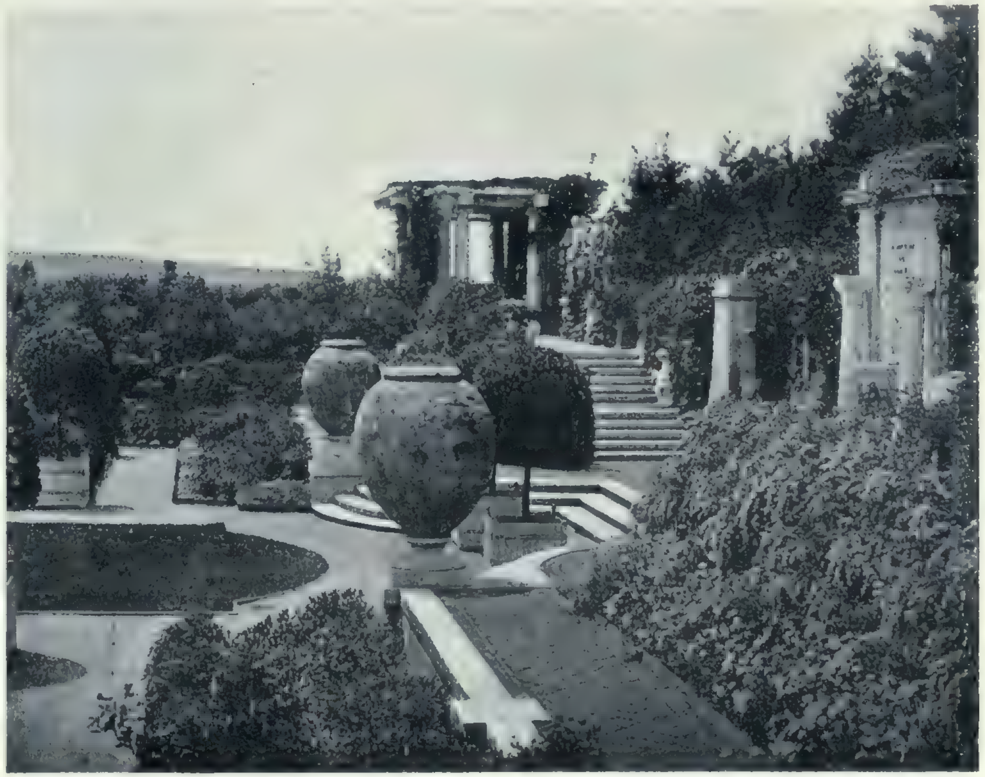
ILLUSTRATIONS

TO ARTICLE ON

FORMAL GARDENS.







broken-hearted call; and at twilight, the night-jar should make his rugged music amid the fern. And the swallow and the sparrow should be made welcome in every corner of my dominions. Generally, I should encourage the quiet birds, the working, building, fighting birds, the birds that sing no more than is necessary, or natural.

"Everywhere in my garden shall be heard the sound of running water, brooks making their way unseen under secret boughs, and fountains whispering to themselves on solitary lawns. There shall be such a rustle of fresh boughs in my garden, and such a ripple of streams, that you shall hardly be able to tell whether the leaves or the brooks are talking. Also there shall be pools hidden away in sanctuaries of the garden, pools sacred with water-lilies, and visited only of the dragon-fly and the lonely bee. And there shall be other ponds in my garden, green mossy ponds as old as the foundations of my castle, fish-ponds, the ancestral home of monastic carp, strange ancient fish with wise, ugly faces, and gold collars round their necks, telling how some old king caught them and threw them back into the pond two hundred years ago."

Along with the development of our country and the ever increasing horde of wealthy citizens, comes a desire for formal gardens. This is evidenced by the large number of estates which have already been laid out, the thousands which are being planned at the present time and the establisment of courses for landscape architects in our universities. The question arises as to whether the architect is broad enough to grasp the essentials of a harmonious treatment between the home and its environs. In the small scheme, yes; in the larger ones it is safe to say no. While we have a few men capable of handling both, still the majority of practising architects are not big enough, a fact readily appreciated from existing conditions.

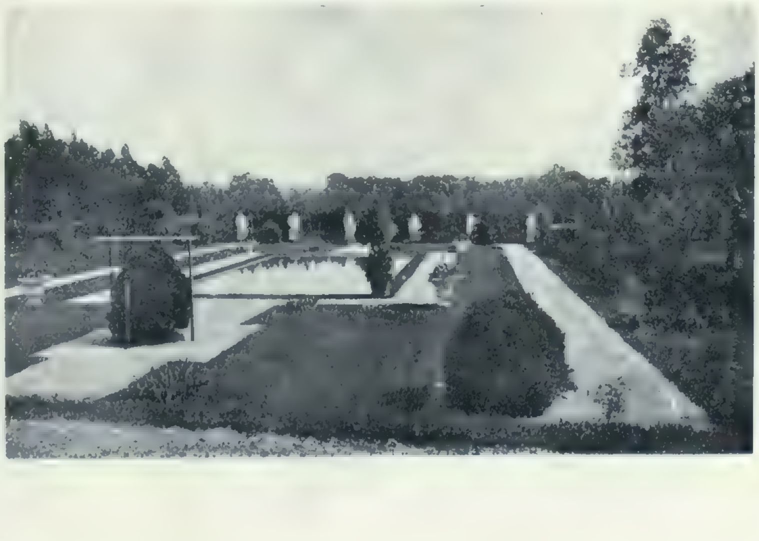
It is an age of specializing, and as the architect allows his engineer to handle the structural phases of his building, so he must employ the landscape expert to arrange his grounds. Care must be taken to see that he fully comprehends the architect's original plan and is sympathetic in respect to the fundamental principles underlying same. Working in complete unison from the very commencement of a project, the outcome will unquestion-

ably be a product creditable in every way to both architects, and a constant source of delight to the privileged.

In referring to the future progress of gardening, T. H. Mawson, in the "Art and Craft of Garden Making," suggests that we should consider first, the training and requirements of the landscape architect; secondly, the ideal which should inspire him throughout his life-work; the former giving us some insight into his practical, and the latter into his artistic equipment.

First of all, he says, must come a general training, which shall be framed with the intention of inculcating that catholicity of ideas, power of concentration, and love of orderly progression and logical sequence which is best attained by an all-round classical education, the fruits of which find their use and expression in every walk of life, and which will be particularly appreciated in work that consists primarily in the welding of component parts into a balanced whole. On this foundation must be built a knowledge not only in every branch of architecture, but also in arboriculture, forestry, engineering and many other most divergent sciences which all go towards the making of a city or the embellishment of its parts. Superimposed on this academic training must be a marked natural versatility which will enable him to appreciate the efforts and the points of view of all the various designers or craftsmen of the component parts of the scheme, and so give to each its proper place and correct emphasis. It thus follows that he must possess the judicial mind with the soul of the artist, a rare combination, it is true, but a necessary one if the confidence of his fellow-workers is to be obtained and held, a condition absolutely essential to success. He must also be able to judge the whole effect before the commencement of the work, and possess the gift of being able to present his conception to the minds of others so sympathetically that they too become fired with his enthusiasm for the ideal, and grasp the spirit of his work.

Mr. Mawson goes on to state that the landscape architect must mark his work with his own art vision. This will be done by the masterly application of the three factors which, for want of more expressive terms, he has designated realism. romanticism and symbolism. "This is his province, to infuse the drab necessities of existence with an inherent beauty, to divert the common crowd from low ideals by the elevation of their environment,



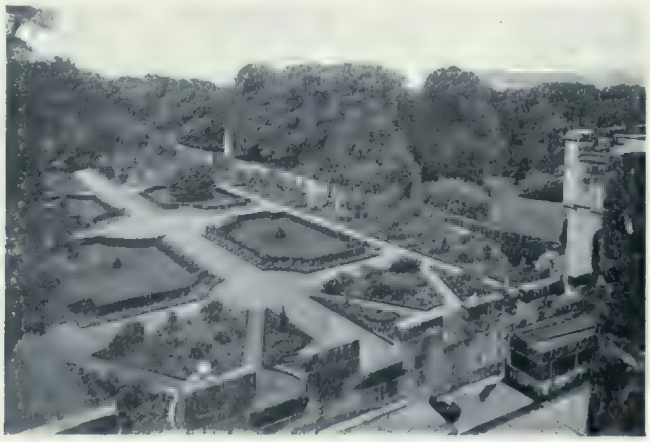
and to cause those who never really loved art and who resent it as a departure from their own level of mediocrity, to rise to more worthy aims. Filled with a right conception of the dignity of his art, and fired with a great desire for its advancement, he expresses out of his own soul his passion and persuades his audience to see what he chooses by materializing his dream, using, as a medium to this end, architecture, verdure, flowers, and the other materials of his craft, weaving the whole into one rhythmic, harmonious composition."

In planning it is necessary to take into consideration the climatic conditions. Our problem is an individual one and while we have the famous Italian gardens as the origin of all subsequent work, the English, French and Spanish accomplishments, still we can do little more than formulate their suggestive qualities into ideas which may be incorporated into our own general scheme. At first English influences produced the open lawn, trees, ponds and bridges with statuary and vases surrounded in beds of flowers. Then as travel, foreign study and literature acquainted us with the famous gardens of other countries a new era began. The fountains, pergolas, balustrades, clipped trees, wide steps—all became incentives towards formal treatment. The open lawn, with only a few gravel paths, the sections with flower beds massed as to color and size, the pool with fountains and walls encircling it, the sunken garden with ornate terraces—all lend themselves to a symmetrical and harmonious ensemble.

In a country so large and with such a varied population, it is impossible to limit our planning to any one fixed historical style. Here as in the States, the Eastern conditions are as unlike the Middle West as that section in turn is different from the land, bordering the Pacific coast.

While we might imagine in the low land and sloping valleys an English garden with trees carefully studied in their setting, winding paths leading through the long stretch of well kept lawn, pools and small lakes, flowers and plantings; still in the statelier and more rugged places we would look for an arrangement of another character altogether. In fact the client often loses sight of the harmonious relations between the garden and its surroundings and wants an effect which will make a decided impression at the first glance. While this may strike the visitor in a forceful manner for the moment at least, yet after the initial delight has faded away he will see the insincerity and lack of judgment. For what could express a more artistic temperament than to have the garden plot developed in a natural way as well as in perfect harmony to the home it is expected to adorn and the original growth and contour of the remaining estate in its every characteristic.

A harmonious ensemble expressive of beauty and character seems to be a fitting key to the whole solution. To explain the point several instances might be cited, the first one being the Rockefeller garden at Pocantico Hills. Here the ground gradually slopes on all sides from a slight eminence some distance to wooded sections conveying the impression of endless boundaries. After due consideration of the natural contour the main axis of the garden fell parallel to the building at the south side. To the north the view is brought to a focus in a marble fountain, the centre of a semicircular garden; while to the south it terminates in a round marble temple. Opposite the iron and bronze gateway to the east is an exedra fountain located in front of the forecourt, which consists of an oval with encircling driveway in the centre of a well kept grass plot. Following the axis from the main



entrance, it passes through the porte-cochère and house to the western terrace where the open lawn between the two principal gardens permits of an uninterrupted view of the river and distant mountains.

One of the unusual features of the above garden is the lighting facilities which have been described as follows: All of the fountains and water effects are equipped with electric lights, so that, together with the lanterns which occur in connection with the iron grilles or are here and there suspended from the pergola roofs or bracketed out from the walls, the garden is as usable by night as in the daytime. There are lights in the heads of the exedra fountain fronting the entrance gates, making three bright streams of water. The basin also has lights beneath its rim, which throw rippling reflections from the waving water on to the curved surface of the niche above. These lights are arranged to be turned on at the house door to welcome or to speed the parting guest.

The figure of the Donatello fountain is lighted by a tiny searchlight concealed in the roof of one of the pergolas. There are Japanese bronze lanterns and stone lanterns and many forms of light posts, while the driveway lights are of open wrought iron resting on cast iron pedestals and were the result of many experiments.

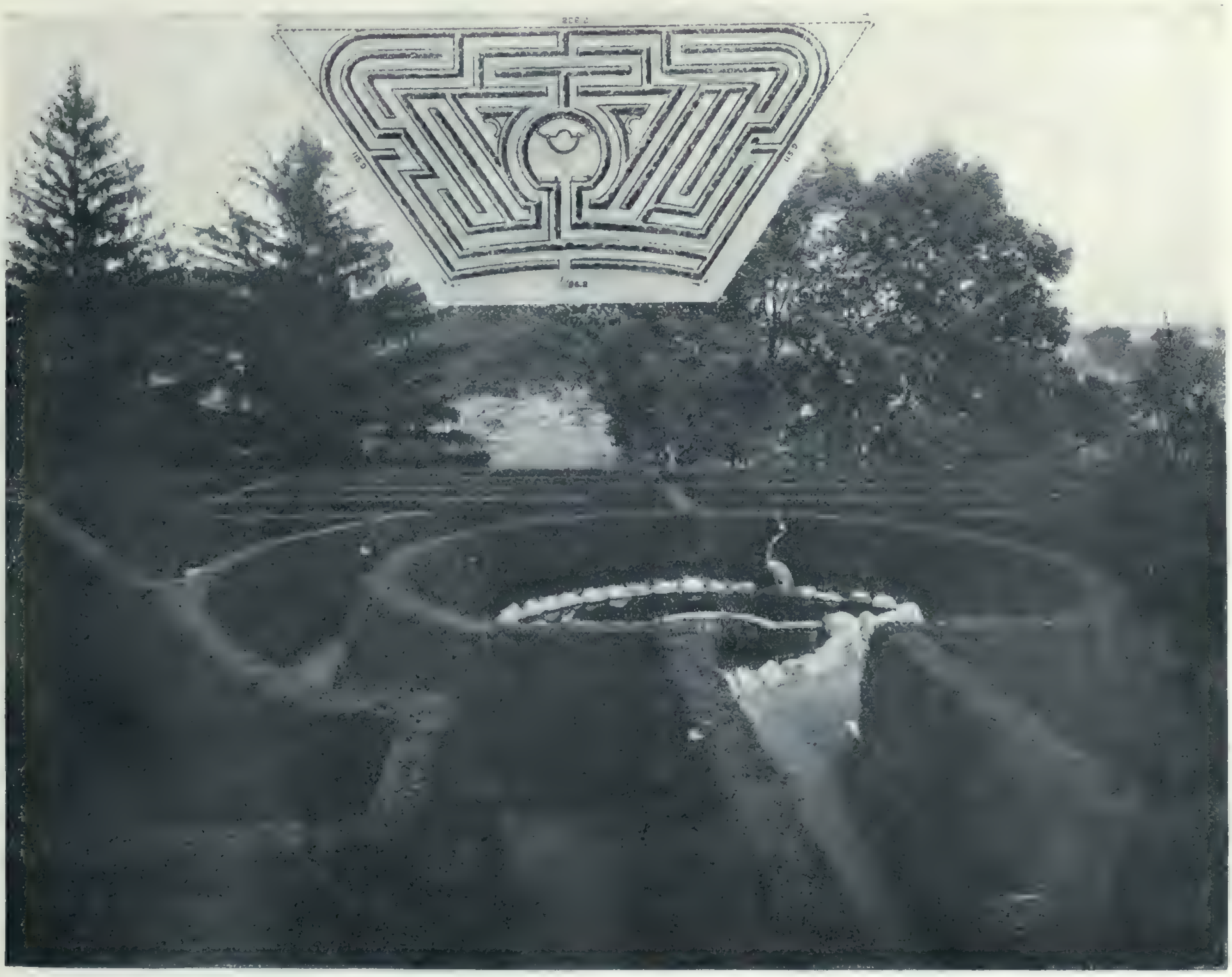
The most effective lighting is the water treatment in front of the teahouse in the inner garden. Here the cascades are lighted and each little basin in the canal forms a luminous bouquet along the central path. The composition is terminated at the farther end by a larger grouping of jets in a basin composed of a monolith of white marble lying on the pavement, in the centre of a decorative mosaic of various colored marbles.

Confined spaces, on the other hand, demand an entirely different scheme, which must also enjoy a harmonious relation to the enclosure, whether that be a series of terraces, high mountains or a wall of marble, hedge or flowers. Take the vicinity of Los Angeles, where wealth settled and the soil is very responsive. One of the most interesting plots developed was a small canyon or unsightly gulch which presented a sorry appearance in the rainy season as the cliffs were gradually washed away. The possibilities were grasped and out of the chaotic condition sprung a number of beautiful sunken gardens. The sides of the unattractive cliff were terraced and the whole planted in grass, furnishing a restful spot among the California oaks and rugged aspect of the promontory.

The rock garden conveys still another situation and demands its own individual handling. Allowance must be made for the hardy flowers and borders planted among the rocks, which keep the soil cool and moist during the summer months and at the same time furnish a warmth and protection during the cold season. The wildlings of the woods, the hardy perennials, the various cacti, the columbine and other rugged growths bespeak of vastly different clothing than the well kept beds of less hardy flowers.

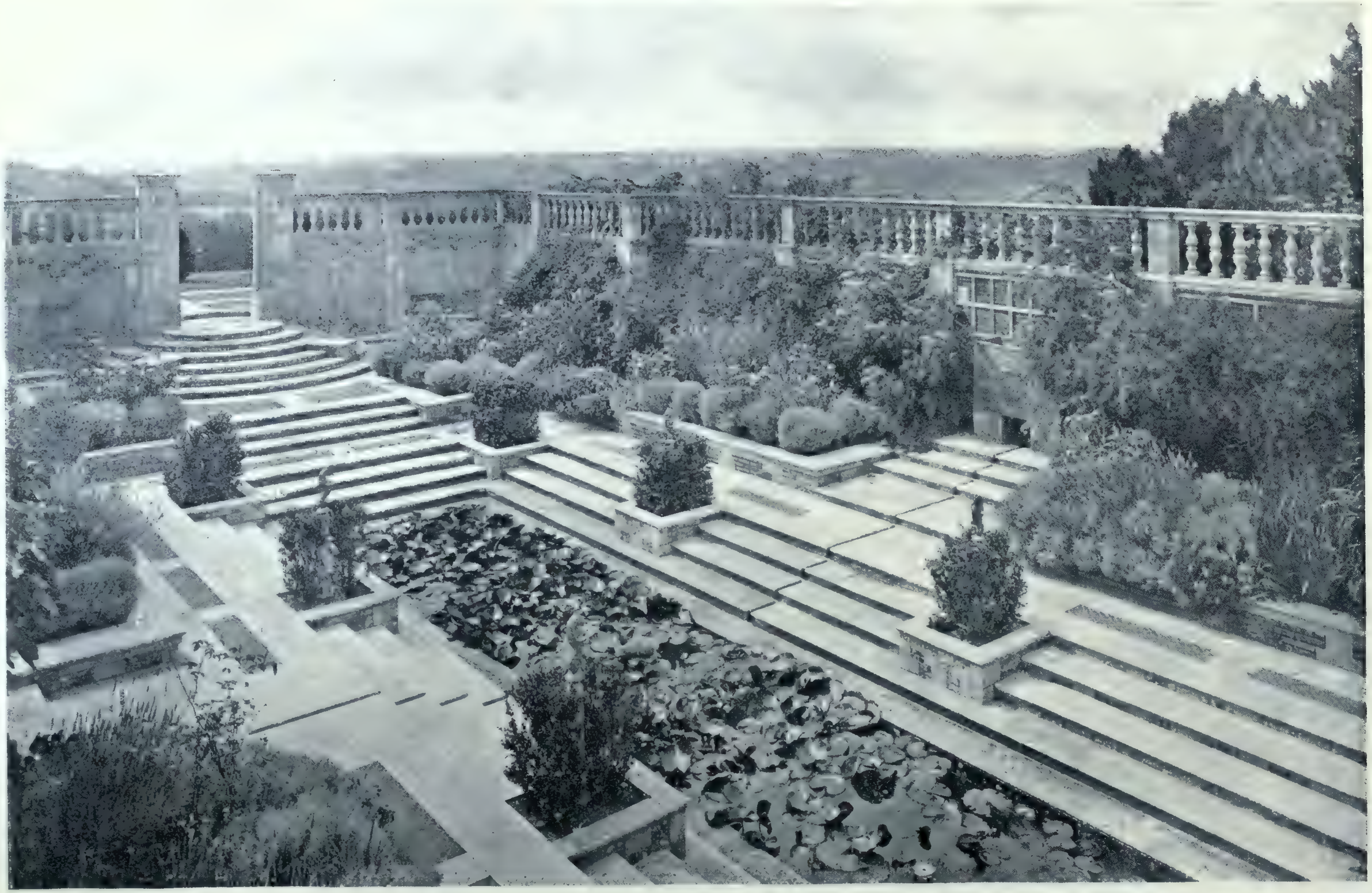
A phase of formal gardening which should be constantly kept in mind is that some time must elapse before we can hope to see the desired results. Too often the scheme, so quickly evolved, is forced aside by the layman because the initial steps show little but crudeness. Nature works slowly and the designer and client must consider together the unsightly walls which they wish eventually to be covered with luxuriant foliage, the bare boulders which need the rock plants and mosses, in fact all the features which must necessarily at first present a rawness most objectionable to the owner. The ultimate effect must be the ideal of the parties concerned, and if sufficient patience is shown in the beginning their aim will be accomplished to a larger degree than originally anticipated.

An example of the amusement grounds for the English knights and ladies of the seventeenth century is seen in the garden maze. Planted in 1896, the scheme carries out the plan of the one at Hampton Court, England, having one thousand trees of arbor vitæ approximately three feet in height. The shortest communication to the centre is nine hundred and forty-nine feet, while the total length of the paths is three-tenths of a mile. The seventeenth century maze is attributed to the reign of William and Mary, 1689-1694, but evidences point to a restoration at that time of an earlier garden planted under the direction of Cardinal Wolsey, 1515-1530.



A MODERN EXAMPLE OF A SEVENTEENTH CENTURY MAZE.

The home should be the most attractive spot on earth to those who are destined to spend most of their time within its walls. This can only be accomplished by having its interior tastefully furnished and its exterior equally attractive. Many authorities say that one-fifth of the total expense for house, decorations, etc., should be devoted to the garden. This may be excessive, but the expenditure on the exterior should be sufficient to have the surroundings an integral part of the ensemble, fitting them to the style of the building. The house must necessarily fail, no matter how artistically it has been designed, if the framework does not show the picture within to the best advantage. As Sedding the Englishman said, "To leave a house exposed upon the landscape unscreened and unterraced is not to treat the site or house fairly. . . . The gardener's first duty in laying out the grounds is to study the site and not only that part of it on which the house stands, but the whole site, its aspect, character, soil, contours, sectional lines, trees, etc. Common sense, economy, nature and art alike dictate this. . . . There is an individual character to every plot of land as to every human face, and that man is unwise who, to suit preference for any given style of garden, or with a view of copying a design from another place, will ignore the characteristics of the site at his disposal."



From "Country Life."

SUNKEN POOL AT "MARSHCOURT," HAMPSHIRE, ENGLAND.

CONSTRUCTION

A · JOURNAL · FOR · THE · ARCHITECTURAL
ENGINEERING · AND · CONTRACTING
INTERESTS · OF · CANADA

Αρχιτεκτονία

FREDERICK REED, Editor

H. GAGNIER, LIMITED, PUBLISHERS
Corner Richmond and Sheppard Streets,
Toronto - - Canada

BRANCH OFFICES:
MONTREAL—171 St. James Street
WINNIPEG, MAN.—13 Royal Bank Building
CHICAGO—People's Gas Building
NEW YORK—156 5th Avenue

CORRESPONDENCE.—All correspondence should be addressed to "CONSTRUCTION," Corner Richmond and Sheppard Streets, Toronto, Canada.

SUBSCRIPTIONS—Canada and Great Britain, $3.00 per annum. United States, the Continent and all Postal Union countries, $4.00 per anum, in advance. Single copies, 35c.

ADVERTISEMENTS—Changes of, or new advertisements must reach the Head Office not later than the twentieth of the month preceding publication, to ensure insertion. Mailing date is on the tenth of each month. Advertising rates on application.

CONTRIBUTIONS—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and duly returned.

Entered as Second Class Matter in the Post Office at Toronto, Canada.

Vol. VII Toronto, February, 1914 No. 2

CURRENT TOPICS

CHARLES S. COBB, architect, has removed his offices from the Canadian Pacific Railway Building to 71 Bay street, Toronto.

* * *

IN TURKEY, where cement is hardly known, a mixture of slaked lime, linseed oil, and cotton fibre is used in exposed places, for filling crevices in water pipes, and covering joints in stone floors, fountains, etc. Generally a hollowed-out stone is used, although a flat, hard surface will answer, and the process is started by pouring the oil on a handful of cotton, after which the lime is dusted in. It is then kneaded until the whole is thoroughly mixed and about the consistency of dough.

* * *

A SCHEME for holding a world's fair in Montreal to celebrate the jubilee of Canada has been presented to the officials at Ottawa. W. Leonard Palmer, who had charge of the British manufacturers' tour through Canada in 1912, is the promoter. The proposal is to have an exhibition which shall be national, Imperial and international in character, and has been commended by the late Lord Strathcona, Earl Grey, Sir Charles Tupper and others. Plans have been prepared by Septimus Warwick, a member of the R.I.B.A., which provide for an exhibition covering two hundred acres and costing five millions. They show a main thoroughfare called Confederation Avenue, on which would be erected Dominion and provincial buildings. A square to be called Strathcona Square is to occupy the centre of the exhibition, in which will be erected a large congress hall. Other squares are to bear the names of King George V and Jacques Cartier. Wide avenues are planned, to be called the Avenues of the Old and New World, with cross roads bearing the names International, Imperial, Laurier and Borden. Four miles of tramway are proposed in connection with the undertakings. The exhibition, according to present proposal, would be opened on Dominion Day, 1917.

* * *

THE FOLLOWING tables indicate the respective gains or losses in building throughout the various provinces. The west has suffered most, only two cities showing an increase, while fifteen out of twenty-five eastern cities have gained in spite of the general depression. The result should be encouraging.

EAST.

	12 Mos., 1913	12 Mos., 1912	Inc.	%
Berlin	$ 647,571	$ 834,213	$ *186,742	22.3
Brantford	1,015,886	1,167.105	*151.219	12.9
Chatham	338,310	201,591	136,719	67.8
Guelph	357,335	388,499	*31.164	8.0
Halifax	835,850	589,775	246,075	41.7
Hamilton	5,110,000	5,491,800	*381,800	7.0
London	1,789,920	1,136,108	653,812	57.5
Maisonneuve	2,454.923	2,685,828	*230,905	8.6
Montreal	27,032,097	19,408,690	7,623,407	39.2
North Bay	492,940	462,675	30,265	6.5
Ottawa	3,991,380	3,621,850	369.530	10.2
Outremont	1,819,000	1,582,000	237,000	14.9
Peterborough	488,540	465,905	22,635	4.8
Port Arthur	1,935,185	2,494,179	*558.994	22.4
Preston	400,055	337,160	62,895	18.6
Quebec	1,929,781	933,002	996,779	106.8
St. Catharines	759,478	811,335	*51,857	6.3
St. John	2,380,660	566,200	1,814,460	320.4
St. Thomas	154,471	89.946	64,525	71.7
Stratford	334,085	439,496	*105,411	24.0
Sydney	321,198	656,111	*334,913	51.0
Toronto	27,038,624	27,401,761	*363,137	1.3
Welland	611,157	469,744	141,413	30.1
Westmount	2,009,544	1.824,369	185,175	10.2
Windsor	1,148,975	988,063	160,912	16.4

WEST.

	12 Mos., 1913	12 Mos., 1912	Inc.	%
Calgary	8,619,153	20,394.220	*11,775,067	57.6
Edmonton	9,242,450	14,446,819	*5,204,369	36.0
Lethbridge	504,954	1.358,250	*843,296	62.0
Medicine Hat	3,851,572	2,836,219	1,015,353	40.0
Moose Jaw	4,225,000	5,275,797	*1,050,797	19.9
N. Battleford	850,195	896.970	*46,775	5.2
N. Westminster	958,975	1,634,518	*675,543	41.3
Prince Albert	1,380,290	2,042,450	*662,160	32.4
Red Deer	149,250	389,015	*239,765	61.6
Regina	4,018,305	8,047,309	*4,029,004	50.0
Saskatoon	2,633,845	7,640,530	*5,006,685	65.6
St. Boniface	1,038,840	1,251,512	*212,672	16.9
Swift Current	1.018,308	791,014	227,294	28.7
Vancouver	10,423,197	19,428,432	*9 005.235	46.3
Weyburn	177,400	766,660	*589,260	76.5
Winnipeg	18,621,650	20,595,750	*1.942,100	9 6
Yorkton	437,777	735,966	*298,189	40.5

* Decrease.

THE FOLLOWING comments are taken from an address upon fire prevention delivered before the Up-to-Date Club at Youngstown, Ohio. Although relating to the States, it is more than applicable to Canada, since our fire loss for 1913 in cities over 20,000 population was $2.88, while that in the United States was $2.55.

Fire prevention as distinguished from fire protection or suppression is a question of social economy, coupled with sound architectural construction.

It concerns the removal of the causes of fires and the adoption of means for their prevention.

Beyond the individual pecuniary interest in his own losses from fire, there is also the obligation of each citizen to his fellows to protect his own property and so conduct his own affairs as not to endanger the lives and property of his neighbors.

The waste of resources in America due to fires and fire protection is greater than the net earnings of all the railroads. The fire loss, if it could be saved, would pay the enormous amount spent for pensions, also the interest on the national debt and leave a surplus of one dollar for every man, woman and child. If the amount expended for fire protection and wasted by fire could be put into good roads, we could build over 50,000 miles of the best roads each year.

We are a nation of money makers, Europe is a people of money savers; we are a people of waste, they are a people of thrift.

Here, we figure a fire is an exchange of property for the ready money; there, they figure that a fire is an absolute loss of toil and resources. We endeavor to extinguish the fire, they labor to prevent it. We are losing a fortune every year, they are saving one.

As a further illustration of the inadequacy of fire extinguishment to meet the situation, we might compare Berlin, with a population of about 3,000,000, with Chicago of two-thirds the size. Berlin has an annual fire loss of $175,000; its fire department costs a little over $300,000. Chicago's fire loss is $5,000,000; it has a whole lake of water along side of her and the fire department costs over $3,000,000.

There is very little inflammable material used in buildings in Berlin and the owner of a building in which a fire starts is made to bear the expense of extinguishing his fire, also to reimburse all losses to others and if he is particularly culpable, he may have to pay a fine, too.

Further comparisons may help to a fuller appreciation of the ridiculous position we occupy from a broad economic standpoint.

	Population	Loss	Per Capita
Frankfort, Germany..	324,500	$ 99,492	$ .31
Cincinnati, Ohio	324,230	1,971,217	6.08
Birmingham, Eng.	550,000	226,506	.41
Baltimore, Maryland..	553,669	916,603	1.65
Toulon, France	101,602	55,391	.55
Atlanta, Georgia	104,984	225,237	2.15

In Europe where building laws have been in vogue for many years the fire records show conclusively the efficiency of building regulations. In 1891 the National Board of Fire Underwriters requested the United States Department of State to make inquiries through its consular service regarding building conditions, building regulations, and fire losses in cities throughout the world, the figures to cover the year 1890. I will use just a few examples of the smaller cities reported. The consul at Calais, France, reports a population of 56,000 with practically no wooden buildings, all being of stone or brick. This latter material being the most plentiful. The number of fire alarms for the year was 7, of which 6 were only chimney fires. The fire department was a volunteer organization and the total loss for the year was less than $4,000.

The consul at Carthagenia, Spain, reported a population of 50,000, all buildings of brick and stone; no fire alarms for the year 1890, the fire loss was but $3,000, and for 1891 it was $2,400. This city has no fire brigade. Huddersfield, England, population 95,000, practically no wooden buildings, 28 fire alarms for the year, and a total loss of about $8,000. No fire got beyond the building in which it started.

Every fire is due to one of three crimes: the crime of ignorance—the man don't know that certain conditions will burn his place; the crime of carelessness—the man don't care whether his place burns or not; the crime of dishonesty—the man wants to have his place burn and cash in at the expense of his neighbors. The first can be corrected by a systematic plan of education and in this connection much might be done to overcome the everyday condition of fire hazard by instruction in the schools. Our schools are the greatest mediums for molding character. Poor construction tends to enormous loss and conflagration but every conflagration has a tiny beginning and it is necessary that we be cured of this "mind habit" of indifference in order to remove the common causes of fire.

The essentials of fire prevention are an elimination of over-insurance; restrictions on the use of the strike-anywhere match, and other measures of that sort to prevent accumulations of litter and waste and to insure the proper control of explosives and inflammables, etc. Finally, we must have non-inflammable buildings. There are other phases of fire prevention worthy of lengthy discussion which the limit on our time prevents entering upon.

The average person having the belief that Nero was an imperial incendiary will be apt to suffer a shock when he learns that a most comprehensive and practical fire prevention building code was formulated and enforced by this ruler whose name is heard more often in obloquy than in praise. Some historians say Nero's act of burning Rome in the year 64 A.D. was not without design; that it was, in fact, an efficient way of removing buildings to make way for a great city plan. However this may be, it is a fact that a better order of things resulted. Ruins were hardly cold before the working population of the city were set to work clearing away the debris, and the royal architects, without regard to former ownership, laid out avenues, squares and parks on a grand scale. A law was enacted that no residences should be higher than twice the width of the adjacent street. This seems to be the earliest record of provision for limiting the height of buildings with relation to the width of the street on which they faced. Tenement houses were required to be isolated, and the two or three lower stories had ceilings resting on stone or brick arches, wood construction being permitted in upper stories only.

It was a magnificent city that Nero began, but after his death in the year 68 A.D., his ambitious plans were ignored or forgotten; the public squares were sold to speculators and high tenements along narrow streets again became the order. In later times we learn that Venice limited the height of buildings to 70 feet, Florence to 100 feet, Paris to 60 feet, and Toledo to 75 feet. Rheims had a curious law forbidding any structure to be higher than the eaves of the cathedral, and it was the duty of the sexton to look daily from the port holes of this cathedral when a building was being constructed to see that it did not rise higher than the level of his eyes. Practically all ancient and medieval building laws dealt with residential structures, since the problems of office and industrial buildings were reserved for this age to deal with. The problem before us must be met in a prompt and forceful manner if the great fire loss is to be thoroughly checked.

* * *

IF YOU WANT to get an idea of how some people are bombarded with circular matter these days, take a look at the daily mail of an established architect—the man who is in the various directories and lists of architects. It seems that everybody from the hardware and paint men to the shingle and slate concern are on his trail, and the result is that some architects are using printed slips, asking manufacturers to refrain from sending advertising matter until such a time as their products are of particular interest. This seems to make out a good case for the architectural magazine that holds a position of authority. Undoubtedly it offers the most auspicious and economical way of reaching architects.—*Printers Ink*, January 8th, 1914.

A SPECIFICATION for making artificial stone is given herewith after the formula of P. L. Andestad, British Columbia. The composition consists of Portland cement, washed sand, dry blue clay, unslaked lime, coal tar and water in the following proportions: Portland cement, 100 gallons; washed sand, 300 gallons; dry blue clay, 25 gallons; unslaked lime, 25 gallons; coal tar, 10 gallons, and water. The amount of water required varies with the condition of the other ingredients and the purpose for which the artificial stone is intended to be used, said amount of water being sufficient, first to slake the lime, and second, when worked up with all the other ingredients, to produce a mortar of the stiffness desired. The manner of combining the ingredients of the composition for making artificial stone consists of slaking the lime and mixing therewith the coal tar while the lime is still warm and allowing the mixture to cool; second, mixing the Portland cement and dry blue clay separately, and then adding the two last-mentioned ingredients to the sand and thoroughly mixing them therewith; third, thoroughly mixing all the ingredients together, sufficient water being put in to make a mortar of the necessary stiffness. Place the mortar in moulds of the shape desired, and subject it to heavy pressure for a few seconds; then take the blocks of mortar from the moulds and allow them to dry.

* * *

THE TELESCOPIC hoist manufactured by Gillis & Geoghegan has been installed in the following Canadian buildings: Trust and Loan Co., Winnipeg; McGill Street Building, Montreal; Bank of Commerce Building, Toronto; La Sauvegarde Building, Montreal; Canada Life Insurance Co., Regina; Brunswick Hotel, Moose Jaw; Willoughby Building, Saskatoon; Laura Secord High School, Winnipeg. The hoist takes up little space and has proven so satisfactory as to merit the commendation it is universally receiving.

* * *

ACCORDING to the report of the census of England and Wales relating to occupations and industries, there are eighty-six women who ply the calling of plumber. Of these seventy-seven are widows. It shows that women have succeeded in establishing themselves in a number of industries where their presence is unexpected. There are seventy women paperhangers and whitewashers, and four bricklayers.

* * *

PROPOSED Government Buildings, Ottawa, Ont. Notice is hereby given that the time for the reception of designs in the first competition for the erection of Departmental and Courts Buildings, is extended for three months to Thursday, April 2nd, 1914. By order, R. C. Desrochers, Secretary.

THE FIRM of Thompson, Daniel and Colthurst, architects practicing in Saskatoon for the past few years has been dissolved. T. B. Daniel and G. B. Colthurst have re-entered a copartnership under the firm name of Daniel & Colthurst, and will continue to occupy offices in the Central Chambers, Saskatoon.

* * *

CONSIDERABLE interest has developed during the past few years among manufacturers and consumers of steel products, especially sheets, regarding the question of corrosion and the devising of changes or improvements in manufacture to reduce such deterioration to the minimum. A product recently placed on the market by the American Sheet and Tin Plate Co., of Pittsburgh, Pa., known as "Copper Bearing Steel Sheets," has solved this problem to a large extent. It has been demonstrated by tests and experiments extending over a period of some two years or more, that a limited quantity of copper introduced into molten steel during the process of manufacture has a remarkable and beneficial effect on the finished product, and steel sheets rolled from this grade of steel have developed much greater rust-resisting powers than ordinary sheets without copper or those products based on alleged "purity" of the metals. This new grade of copper-bearing steel sheet is softer and more ductile than ordinary sheets and has proven to be more satisfactorily worked into forms and shapes, especially when subjected to severe drawing or forming operations. A copy of a pamphlet issued by the United States Steel Products Co., describing this new commodity and illustrating by photographs the various tests made by their chief chemist, will be supplied on application to B. & S. H. Thompson & Co., Ltd., Montreal, selling agents for Eastern Canada.

* * *

"DOORWAYS" is the title of a monthly booklet issued by the Richards-Wilcox Canadian Co., Ltd. The January number is the architects' edition and contains information regarding flush door hangers, tracks and brackets which should prove very beneficial to architects and engineers. Each issue strives to present clearly some important subject in a descriptive and illustrative manner, and will be welcomed by all members of the architectural world.

* * *

McDONALD & WILSON carried out an important contract in the installation of the lighting fixtures in the Central Y.M.C.A. Building illustrated in this issue. The work is indicative of the advance made in this direction and conforms to the needs of the Association in every respect.

ANNOUNCEMENT is made that Bird & Son are now at work on an extensive addition to their present large plant for the handling of their increased demand for Neponset waterproof wallboard and a Neponset shingle which the company will place on the market—the first of its kind in Canada. The addition will cost $15,000 and will be equipped with $10,000 worth of modern machinery. The company is introducing another innovation by sending H. F. Nobles, of St. John, N.B., to Australia in order to enlarge their trade in that country. Mr. Nobles has handled the Eastern territory for years and will enter his new field with a successful past experience which should auger well for the company's progress in foreign fields.

* * *

THE FRID LEWIS COMPANY, of Winnipeg, will open an office in Regina about February 15th, in order to make preparations for the erection of several large buildings for which they have been awarded construction. One of the largest undertakings that this company will handle will be the erection of the new Cameron and Heap warehouse. This building will be situated on Dewdney street in the heart of the industrial section. It will be five storeys in height, of reinforced concrete, fireproof construction, and it is estimated that it will cost in the neighborhood of $80,000.

* * *

THE Eureka Refrigerator Co., are moving into their new offices at Brock Ave., Toronto, where ample show room will be provided for the display of their stock. This firm has installed one of their large refrigerating plants in the Central Y.M.C.A. similar to those supplied to numerous public institutions during recent years.

* * *

THE LAST WORD

in the art of manufacturing High Grade Surveying and Drawing Instruments has been developed in the Dietzgen Instruments, the possession and use of which guarantees accurate results.

Scales, Slide Rules, Draughting Equipment and Accessories of a complete list are also manufactured by us and sold direct to the Architect and Engineer.

BLUE PRINTS
made from tracings a specialty.

EUGENE DIETZGEN CO., LTD.,
116 Adelaide St. W., Toronto.

CONSTRUCTION

March, 1914 Vol. 7., No. 3

CONTENTS

EDITORIAL 79

The small house planned to be artistic and homelike——Housing conference held in Cincinnati——The struggle in England over the registration of architects.

THE SMALL HOUSE 81

HOUSES COSTING FROM $2,500 TO $5,000 91

HEATING THE SMALL HOUSE 98

THE GARDEN CITY MOVEMENT 99

HOW TO GET CHEAP HOUSES 106

LIFT BRIDGE AT KAMLOOPS, B.C. 116

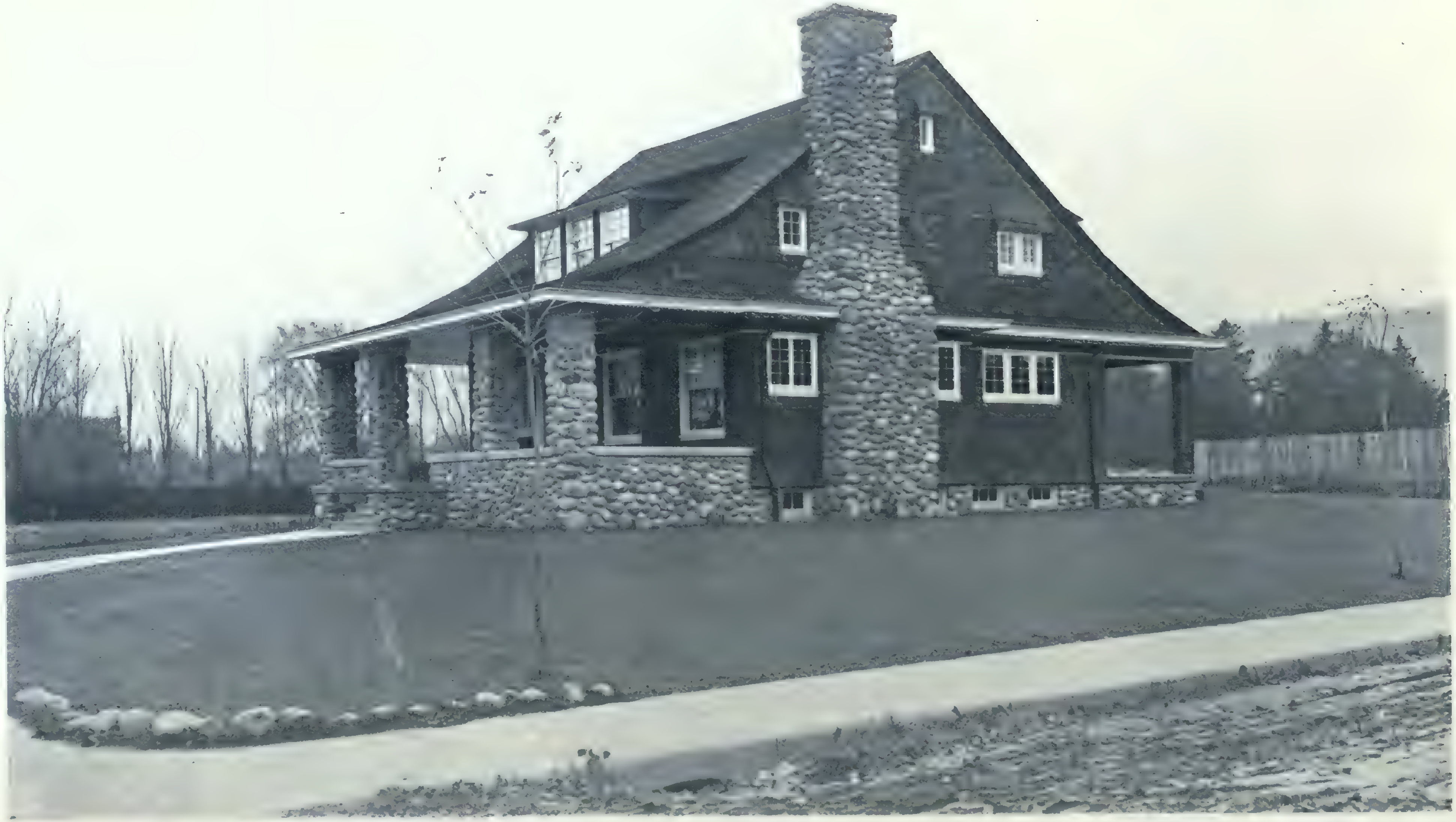
CURRENT TOPICS AND TRADE NOTES 118

Full Page Illustrations

HOUSE AT HAMILTON .... Frontispiece

HOUSES AT TORONTO 82-90

H. GAGNIER, Limited, Publishers
GRAPHIC ARTS BLDG., TORONTO, CANADA
BRANCH OFFICES:
MONTREAL WINNIPEG CHICAGO NEW YORK



HOUSE AT HAMILTON, ONT.

HERBERT H. NEW, ARCHITECT.

EDITORIAL

The small house should be carefully planned to conform with the general surroundings and possess an artistic and homelike atmosphere throughout.

THAT THE small house of low cost receives too little attention is quite evident from the manner in which the vast majority are erected. For every home that shows the imprints of an artistic nature there will be a hundred most commonplace and unattractive. The question naturally arises, is this a condition which is productive of a wholesome influence? Surely not when we come to consider that practically all the time is spent there by woman-kind; that the men of to-morrow are greatly influenced by the moral and artistic impressions of their present homes. What we need to eradicate from our midst is the real estate speculator who erects so many houses for a certain fixed sum; thinking nothing of the general appearance of the street or the homelike feeling of each dwelling. His only aim is to boast of so much money made through his selfish nature at the expense of the city and the respective owners. It is an absurd fallacy to think that a cheap house cannot be artistic—in fact the less it costs the more care and study it should receive from the hands of an experienced designer. He alone knows how to work out a plan which conforms to the site and expresses the will of the owner. If the characteristics of the land are carefully considered the exterior and interior will be a natural outcome and form an integral part of the ensemble. As for the character, it is immaterial whether it be of brick, stucco, half-timber, or some other material as long as it is artistically simple and expressive of good design. In this number are examples of houses taken from Montreal, Toronto, and other cities, which approximate in cost $5,000 and which all possess an individuality of their own. They look like a real home with a sense of domesticity; and they will grow artistic as nature weaves her charm about them. The children will grow up to love the atmosphere of the place and will in turn strive to have their own home expressive of the same artistic and harmonious effect.

Housing conference held in Cincinnati—Work being done by the municipality of Cleveland—Deserving of universal support in every large city.

THE THIRD National Conference on housing in America held in Cincinnati December last, reveals clearly the universal interest that is being taken in the matter of providing homes for the working-man. Every Canadian city of importance was represented and it is especially pleasing to note that the solution of this problem is being well worked out in our own provinces. In another part of this issue is printed an able paper given before the convention by G. Frank Beer on "How to Get Cheap Houses," which should prove helpful in placing comfortable homes at the convenience of the poor and thereby eliminating the curse of the slums.

To provide the conscientious wage-earner with a house, cleanly and sanitary, will do more to elevate the social conditions of the people than the ecclesiastical work, which is unquestionably one of the mighty powers for good in any community. The home with its surroundings is the molding force in the child's life, and if so, then let it be wholesome. With a proper environment the children will grow into healthy forceful citizens wiping out the miserable localities which prove only a menace to the health and morals of the people as a whole. The city of Cleveland is planning America's first municipal model suburbs of five hundred houses on a plot containing ninety-three acres. One of the prominent ideas is to provide enough land to allow for every legitimate impulse of its tenant families; a fixed percentage of the land to be devoted to front and back yard gardens, while a certain amount will be reserved for athletic grounds. The buildings are to be grouped into units, with the thought of keeping all improvements at as low a cost as is consistent with durability and economy.

Aside from the furnishing of homes at a legitimate cost, one of the advantages to this scheme is the orderly and proper expansion of the city. Nearly every municipality has been spoiled by the haphazard work of real estate dealers, whose one sole ambition seems to be to buy, stake out and sell quickly, irrespective of any considerations for the buyer or the future of the locality selected. This universal impetus towards a betterment of housing conditions is a worthy one and should feel behind it the necessary support of both money and brains.

The struggle in England over the registration of architects—The great lesson taught to Canadian architects on the need of Parliamentary authority.

The registration of architects in England has become a matter of serious import and may eventually disrupt the profession. Men standing high in the realm of art are widely at variance on this subject, as are the different architectural bodies. The Society of Architects in London have drafted a bill called the Architects Act, 1914, which may be summed up in clause 25: "From and after the first day of January, 1915, a person shall not be entitled to take or use the name or title of architect (either alone or in combination with any other word or words, save only that of naval architect) or any name, title, or description implying that he is registered under this Act, unless he be so registered. Any person who, after the above date, not being registered under this Act, takes or uses any such name, titles or description, as aforesaid, shall be liable, on summary conviction, to a fine not exceeding twenty pounds and on repetition of the offence fifty pounds." It also provides that no person shall be entitled to recover any charge in the court of law for any professional services rendered by architect not registered under the Act itself; that no certificate issued by an unregistered architect shall have legal validity. This bill is of interest to the Canadian architects not only because it is a problem confronting us at home, but also since it contains clauses relating to their work in the British Isles. Clause 34 states that an architect residing in any British possession and properly qualified shall upon payment of a fee not exceeding five pounds be entitled to register without examination.

The Royal Institute of Architects on the other hand, having transacted all business by charter, and having grown under it to a high plane of influence and power, feel that it would be useless to attempt such legislation. After years of deliberation they have finally passed the following amendment presented by Sir Aston Webb: "That the council be hereby authorized to prepare, and to submit for the approval of the general body, a petition for presentation to the King, praying his Majesty to grant a new charter, containing such further privileges and powers as are required to promote effectively the advancement of architecture by enabling the Royal Institute of British Architects to register and to distinguish persons qualified to practise."

Mr. Webb, in his address to the R.I.B.A., pointed out the many difficulties which have confronted that organization in their efforts to obtain legislation. He feels that the engineers and surveyors would oppose a registration bill and that Parliament would never pass one containing penalizing clauses. That surveyors, builders, etc., seek and accept commissions to do architecture is not sufficient reason for going to Parliament and relates how it even refused to entertain the proposal of recognizing the Institute's membership. He believes the efforts of the R.I.B.A. should be directed in placing the personnel of its members on such a plane that the public would appreciate, when employing one of its members, the high standard which insures in itself a conscientious treatment.

In referring to the present proposals, Mr. Webb said: "They would give a distinctive and exclusive title to members of this Institute. I understand that the Privy Council would be prepared to consider schedules of charges which would, if approved, be held in courts of law as reasonable and proper charges. The third advantage we should have would be that our examinations would be approved by the Privy Council, and we are given to understand we should have no difficulty about this, because they look upon us as reasonable men.

Surely it is incumbent on every architect in Canada to consider seriously the subject of registration; the years of struggle over this problem in England and the wide difference of opinion resulting therefrom. In speaking of the Institute's action, Mr. Webb says: "But fancy an Act of Parliament binding architects! There are not three architects in the House of Commons." Is this not true in Canada? It behooves us to anticipate our future deliberations and secure a better representation. The architectural profession is of such a size and so necessary for the artistic and practical development of our country that it is deserving of ample authority in the Parliament of the people in order to institute and carry through ony measure conducive to the welfare of its members and its prestige. It makes little difference whether we feel the need of Government authority or not in respect to the qualifications of the architect, the fact remains that we should become a potent factor in the development of Canadian art. This is very evident in reviewing the growth of architecture under legal authority in the past. And we cannot afford to sacrifice the present opportunities and the future prospects by allowing our rights to be handled wholly by men with little or no training in the world of art.

The Small House

NO STRUCTURE expresses the æsthetic tastes of the people so much as the home, and especially the small and inexpensive type. The city which contains a large percentage of artistic houses may be designated as a centre of culture and refinement. For while they represent the work of an architect imbued with a love for the beautiful, still they depict to a certain degree the ideals and desires of the owner. Canadian work is greatly influenced by the English, who excel in home building. Yet there is a gradual development in the direction of our own necessities which will evolve sooner or later a local style embracing the practical and the æsthetic into one harmonious ensemble.

The small house, to be essentially economical, must conform to the law of simplicity. Each part must be considered in relation to the whole so that no detail, however ornate, is lost in the general effect. It is also necessary to plan the limited area so as to secure the maximum usefulness within. Comfort and utility have to be kept constantly in mind.

The resources of Canada are so great and so varied as to allow the widest range of materials from which to build. Stone, brick, plaster, tile and wood which have formed the nucleus for building in every age, are all at the command of the architect and builder. While wood remains the cheapest structural material, still its perishable nature has practically eliminated its use upon the exterior. It is essential, however, in the half-timber house in order to satisfy the client who admires the contrasts of dark and light effects. Brick, on the other hand, which lends itself to different textures and colors, is practically as inexpensive as timber, and made in every Province from local clays. When the building is constructed out of native materials it invariably follows that it harmonizes best with the surroundings in an artistic as well as a practical manner.

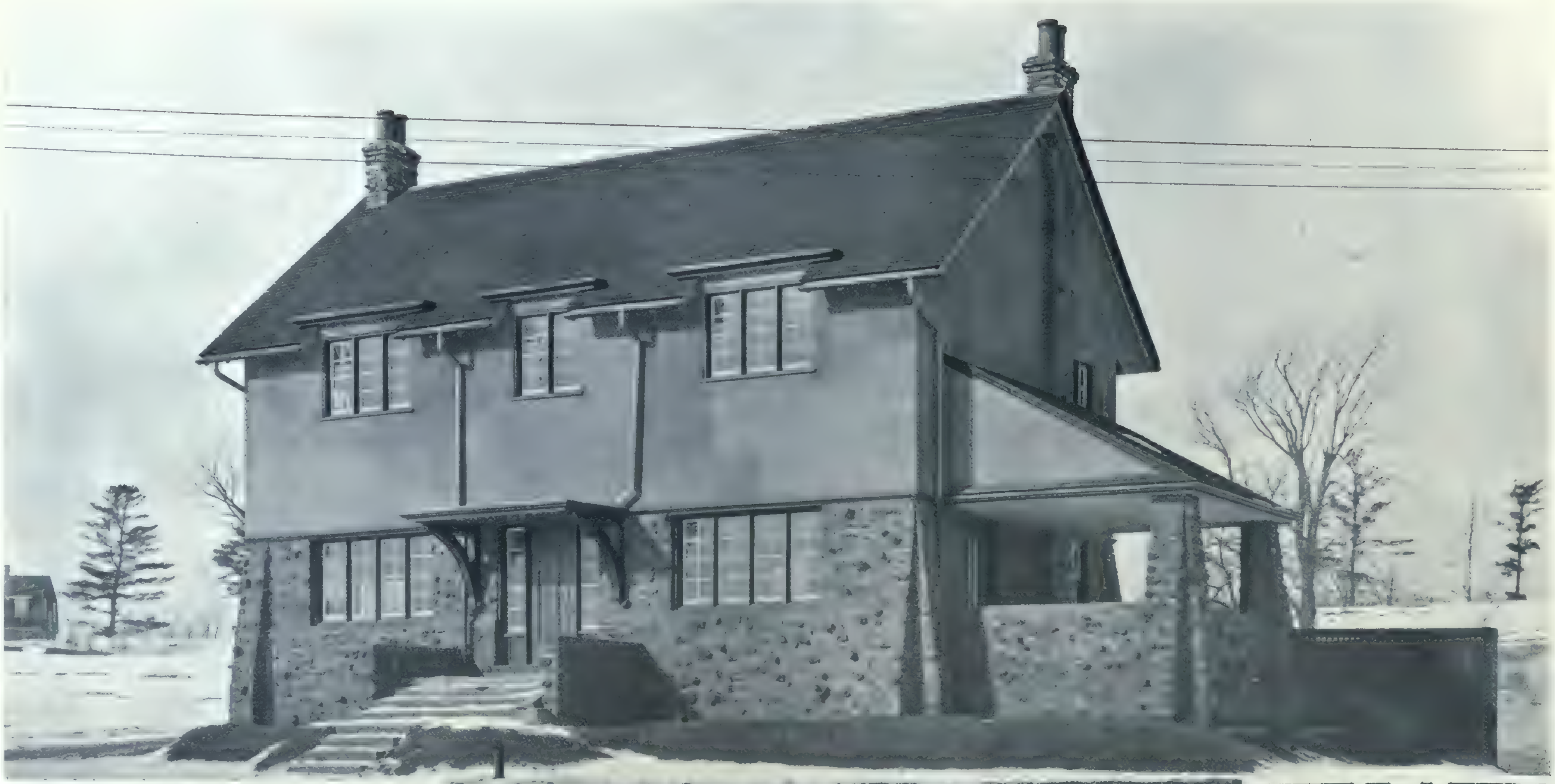
The desire for plaster in the treatment of exterior surfaces arises from the broad simple surfaces unbroken by joints. This material is quite susceptible to textural effects at a minimum expense, thereby bringing it within the range of all home builders. Up to the present time, ignorance of handling has caused the client and builder to avoid its usage. When applied to wooden structures covered with wire lath unless properly applied it is quite liable to crack. To avoid this the plaster applied to the outer face should be back-plastered directly upon the inner surface, thereby protecting the lathing on both sides and obtaining a durable exterior finish. By boarding the studding the building is warmer in winter and cooler in summer on account of the air space between the boards and the exterior plaster.

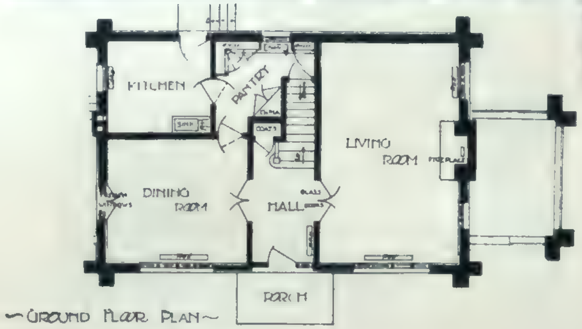
BEDROOM IN HOUSE, PAGE 83.

Many charming homes have been built with the combination of half-timber and plaster. The great danger in this is the crack-

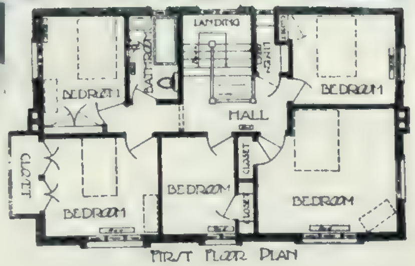
LIVING ROOM IN HOUSE, PAGE 83.

LIVING ROOM IN HOUSE, PAGE 87.





~GROUND FLOOR PLAN~



FIRST FLOOR PLAN

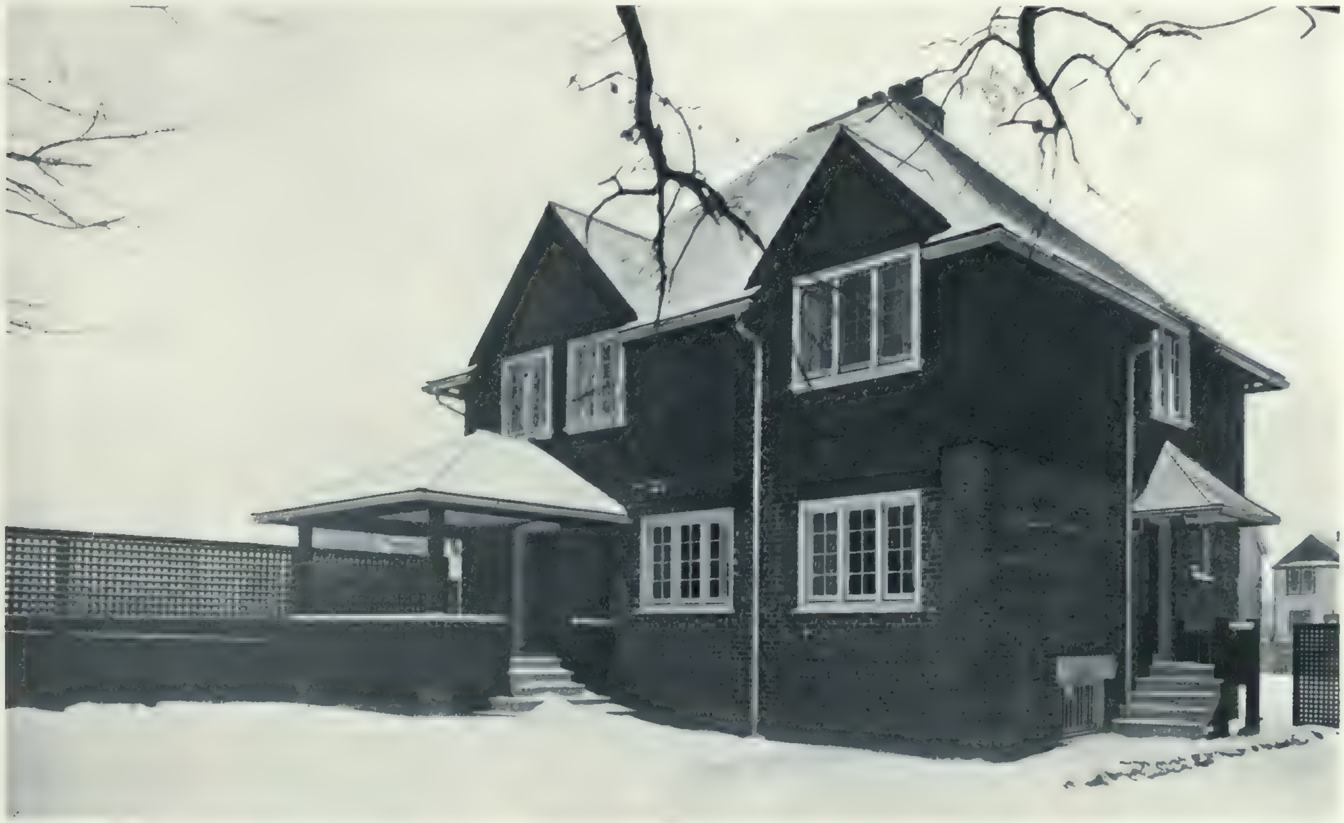
HOUSE AT TORONTO.

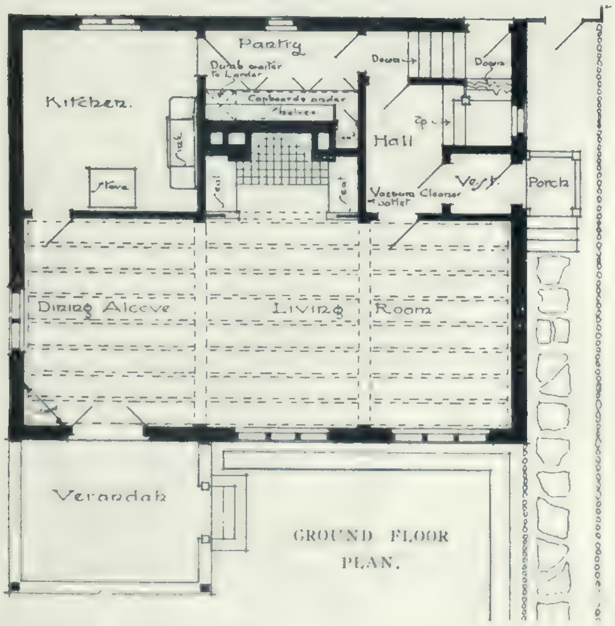
CHADWICK & BECKETT, ARCHITECTS.

ing of the plaster sometimes due to the woodwork, which is more susceptible to shrinkage. In order to prevent the timber from pulling away, it is advisable to construct the wooden parts separately and in placing them allow a clear space between the timber and the plaster. Such a scheme will prevent the rain from reaching the back of the plaster, thus eliminating all chances of cracking. In this method as in the straight plaster work it would be well to have the walls of brick similar to English examples. By the use of second-hand bricks the cost would be very little in excess of wooden frames and would present a surface of additional binding quality.

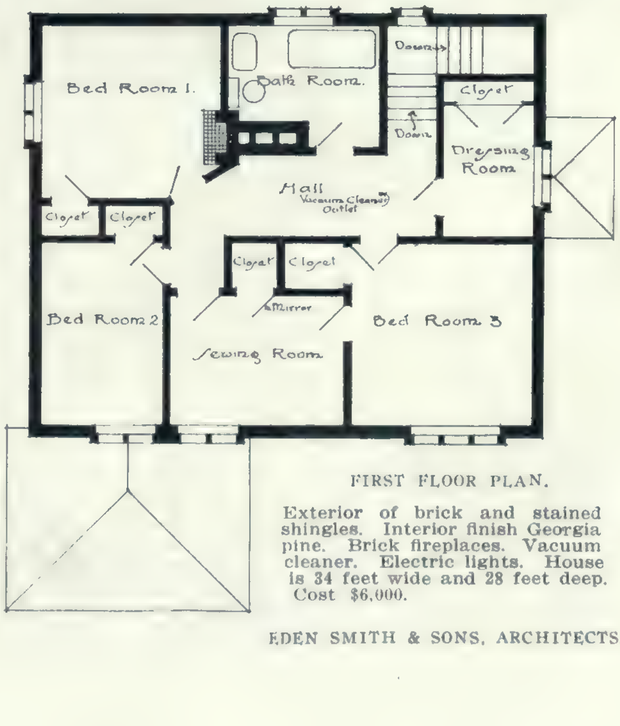
The exterior features which either make or spoil the design are the roof, porch, and windows. The roof is extremely important, as its definite silhouette creates the first impression.

The following pages show a number of small houses built recently in Toronto. They are the result of a demand for better social and domestic surroundings. Each one portrays an individuality which augurs well for the character of the small home in the future. With the profession rests the verdict. If a consistent effort is made to plan an attractive house, well suited to the needs of the people who live therein and adapted to the practical nature of the site, then the desire for better residences will become universal.





GROUND FLOOR PLAN.

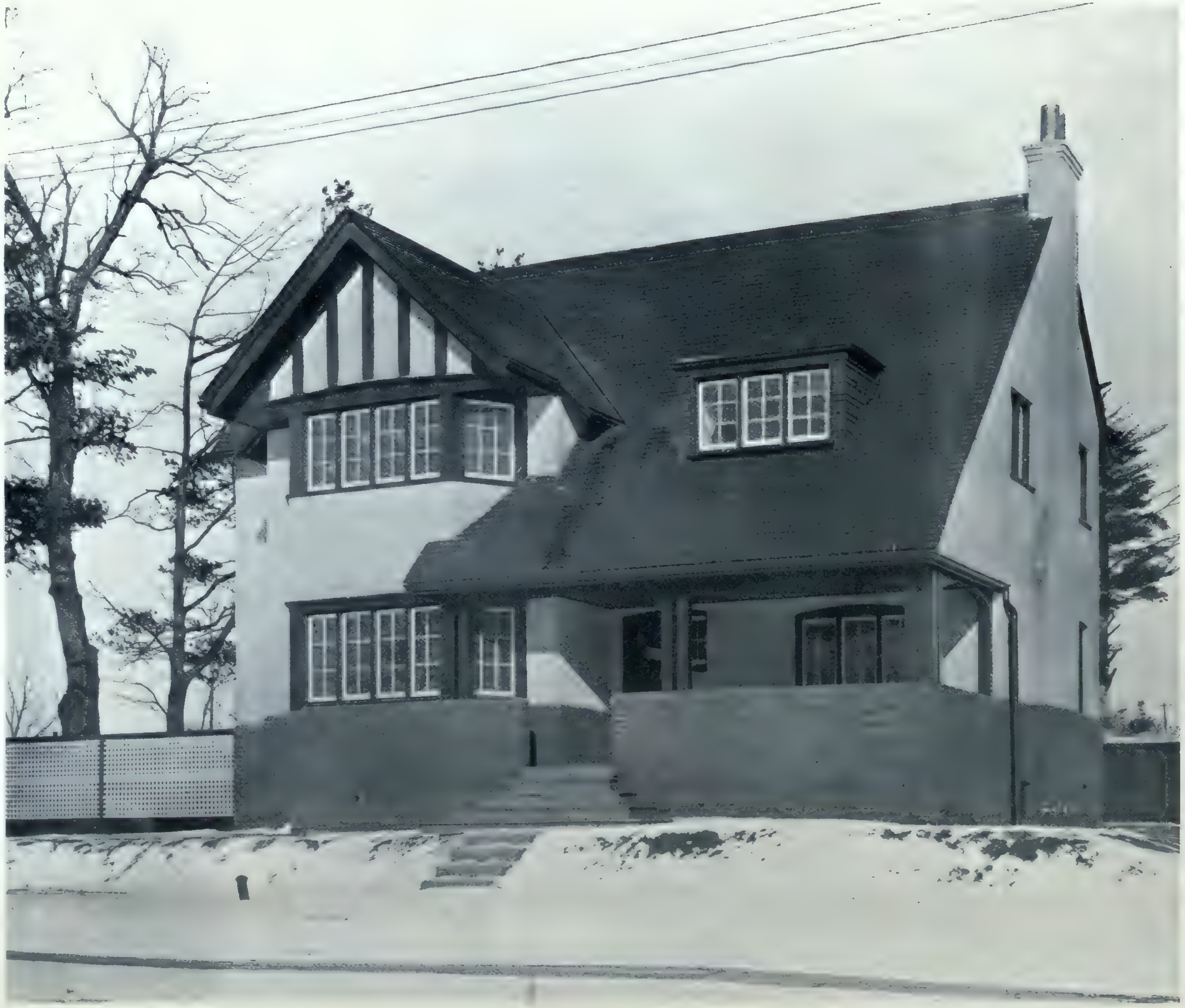


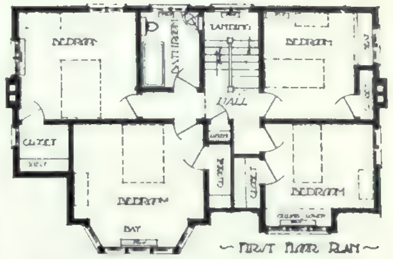
FIRST FLOOR PLAN.

Exterior of brick and stained shingles. Interior finish Georgia pine. Brick fireplaces. Vacuum cleaner. Electric lights. House is 34 feet wide and 28 feet deep. Cost $6,000.

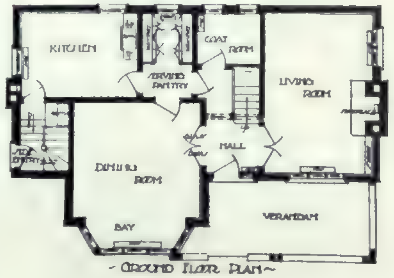
HOUSE AT TORONTO.

EDEN SMITH & SONS, ARCHITECTS.





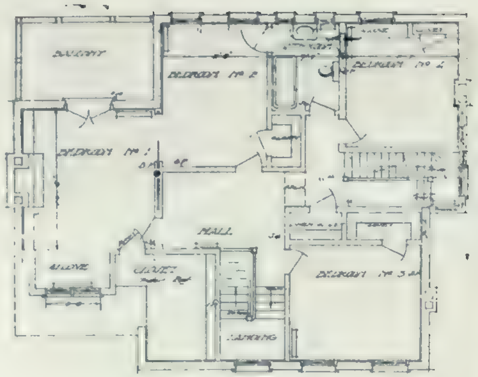
~ FIRST FLOOR PLAN ~



~ GROUND FLOOR PLAN ~

HOUSE AT TORONTO.

CHADWICK & BECKETT,
ARCHITECTS.

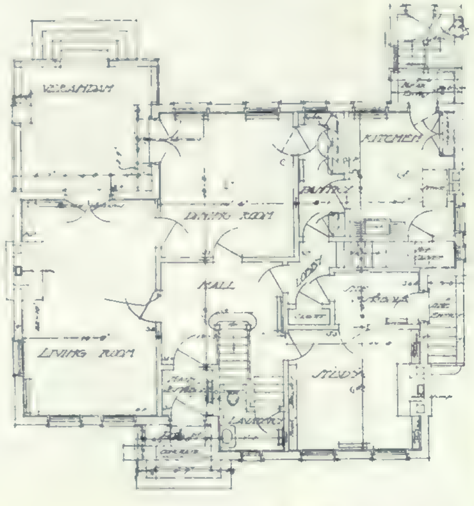


FIRST FLOOR PLAN.

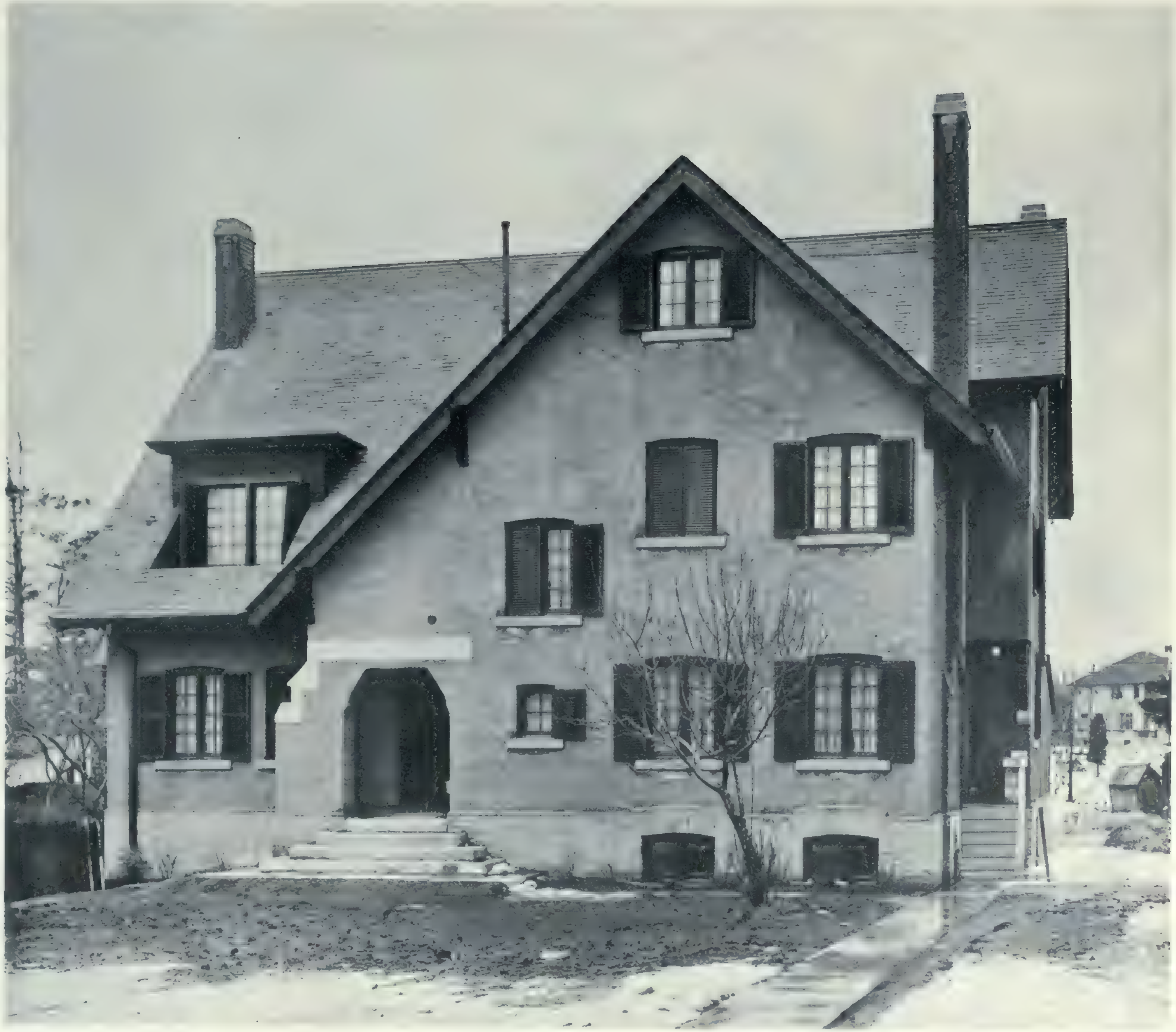
HOUSE AT TORONTO.

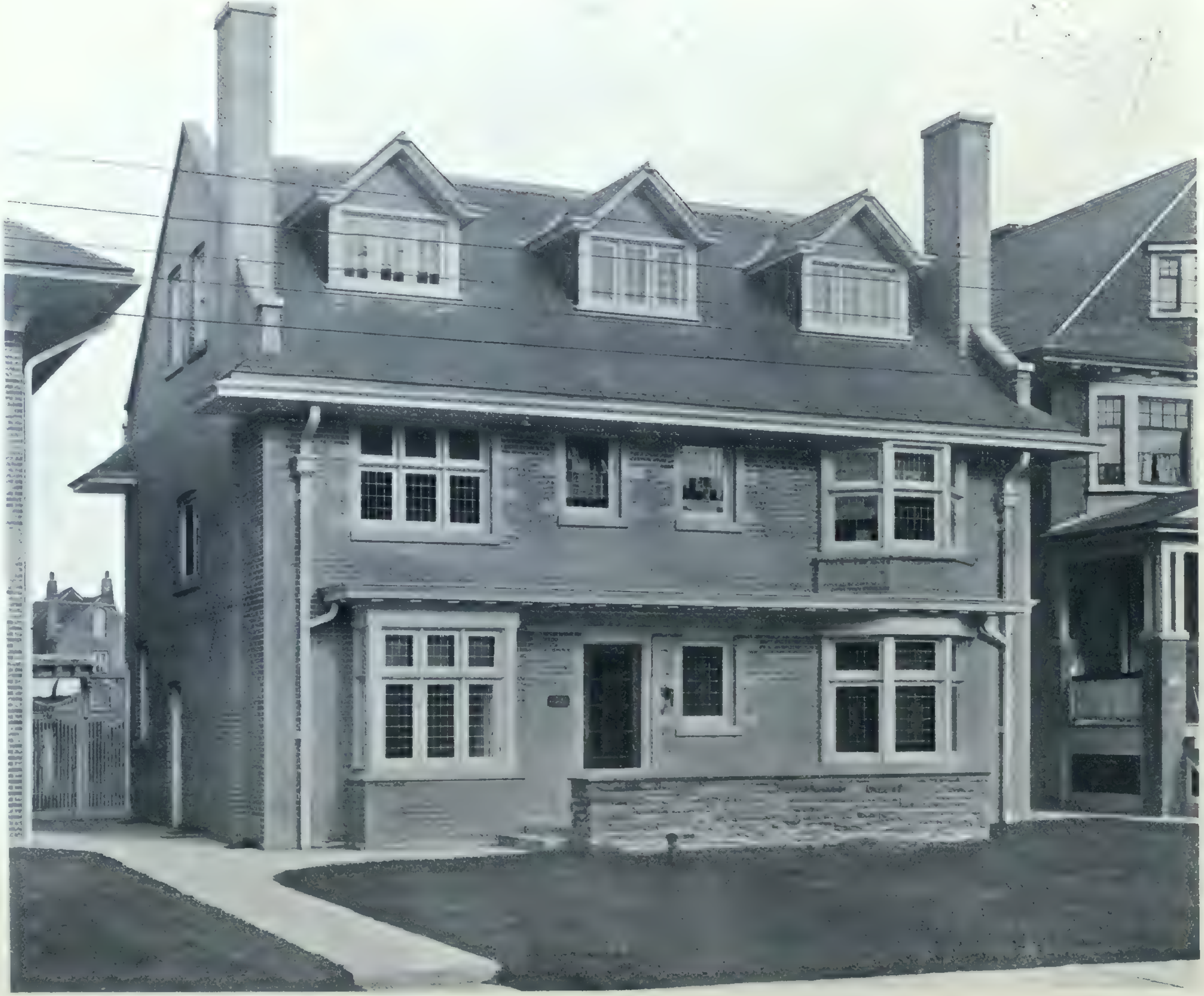
CHADWICK & BECKETT, ARCHITECTS.

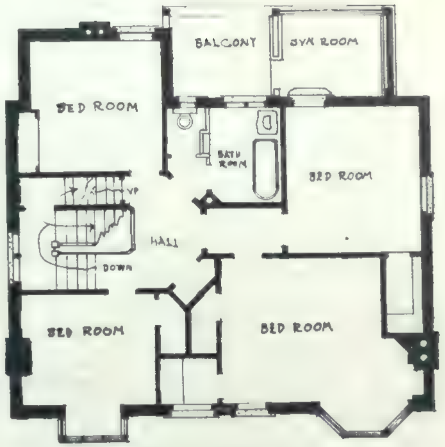
Exterior of stucco on brick. Shingle roof. Ground floor finished in cypress with beech floors. Brick fireplaces. Hot water heating. Cost approximately 18 cents per cubic foot. House is 43 feet wide and 37 feet deep.



GROUND FLOOR PLAN.





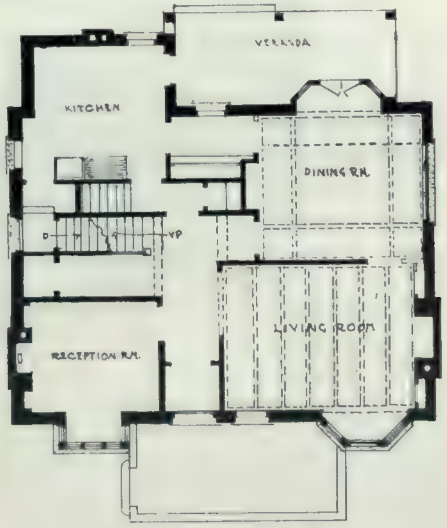


SECOND FLOOR PLAN.

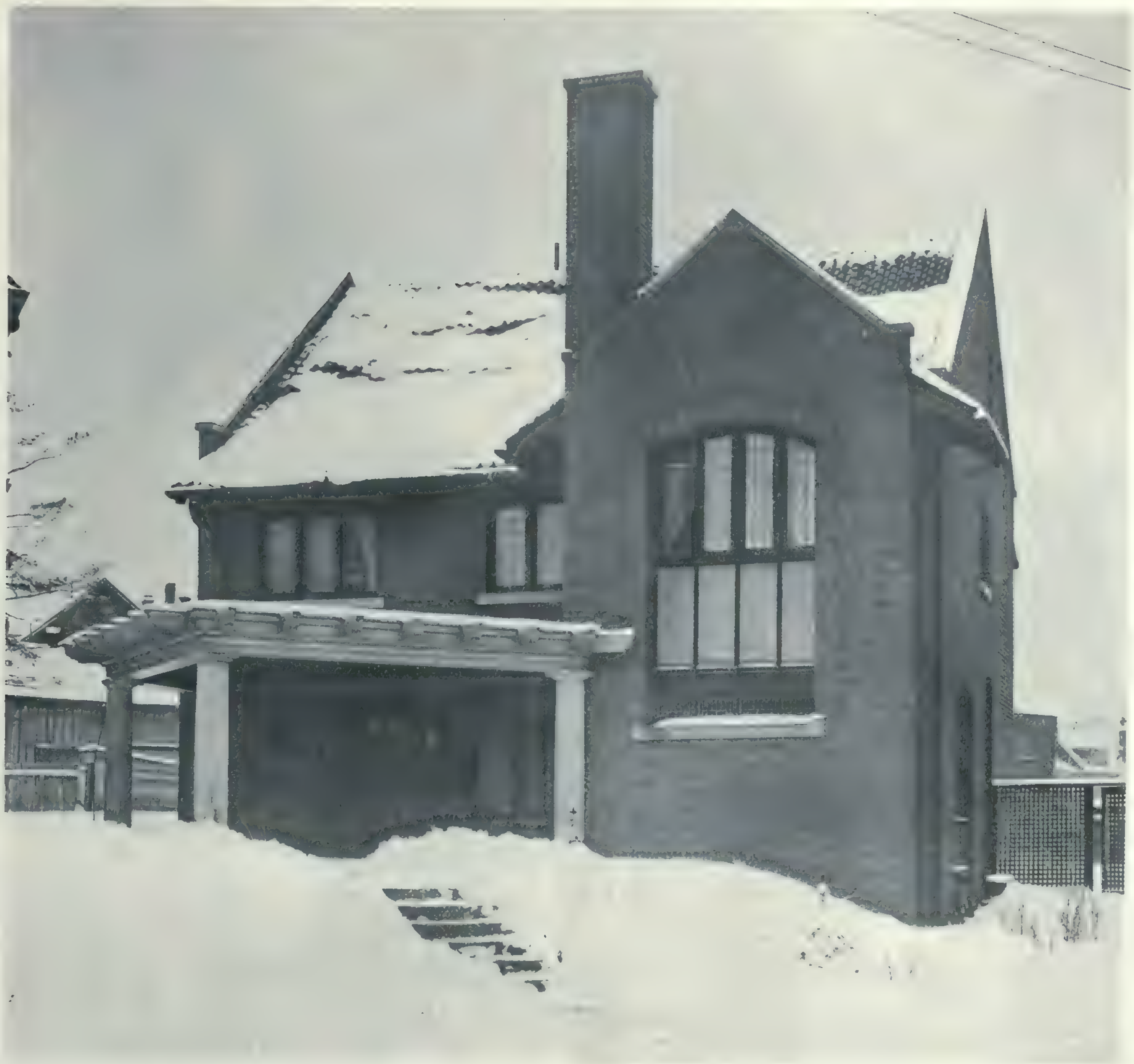
HOUSE AT TORONTO.

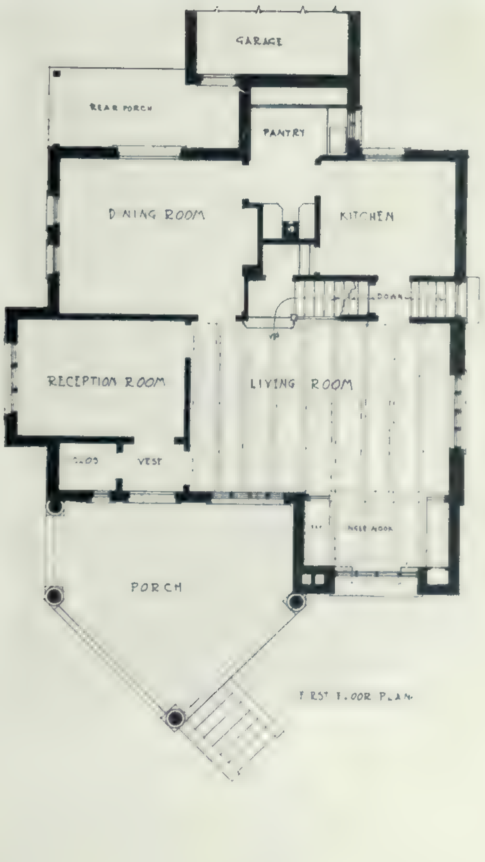
HENRY SIMPSON, ARCHITECT.

Brick exterior. Slate roof. Hardwood trimmings. Brick fireplaces. House is 38 feet wide and 35 feet deep. Cost $8,000.



FIRST FLOOR PLAN.

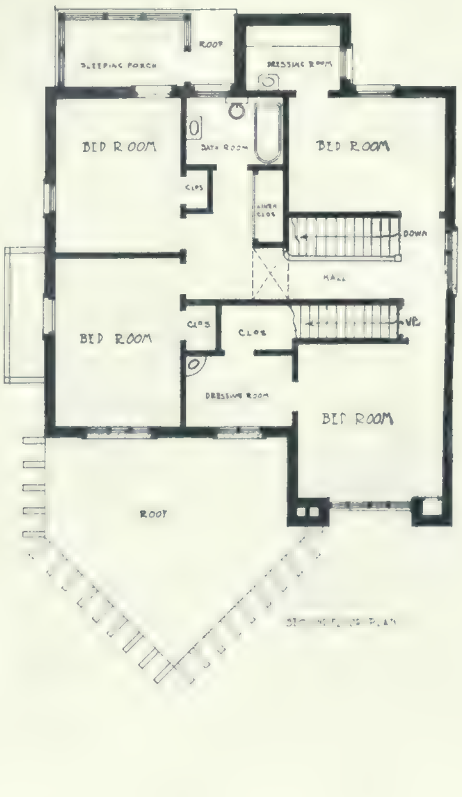


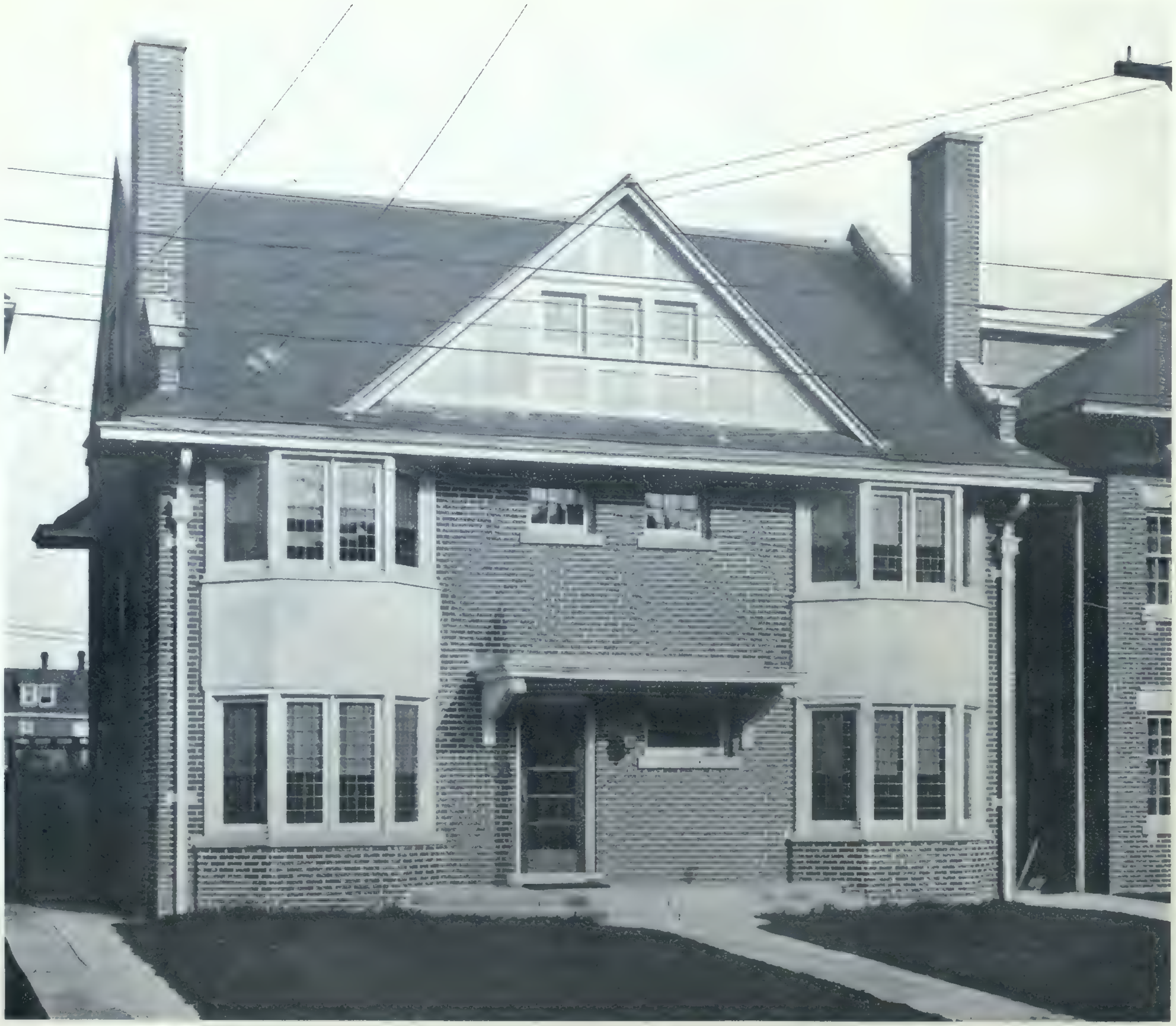


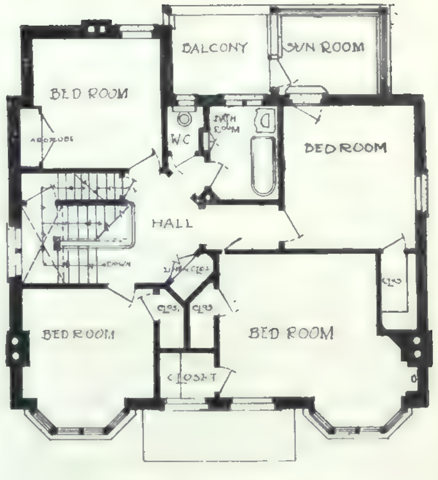
HOUSE AT TORONTO.

HENRY SIMPSON, ARCHITECT.

Brick construction. Spanish tile roof. Tile fireplace. Interior finish of oak and mahogany. Electric wiring. Hot water heating. House is 35 feet wide. Cost $8,000.





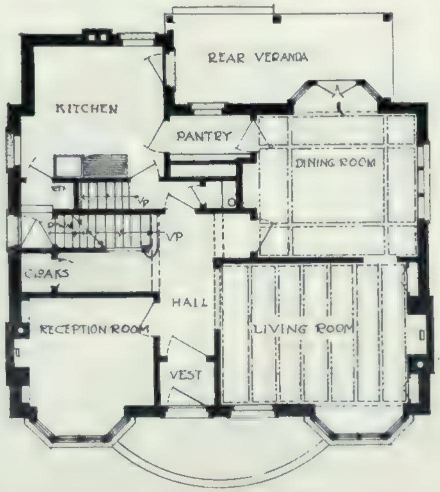


SECOND FLOOR PLAN.

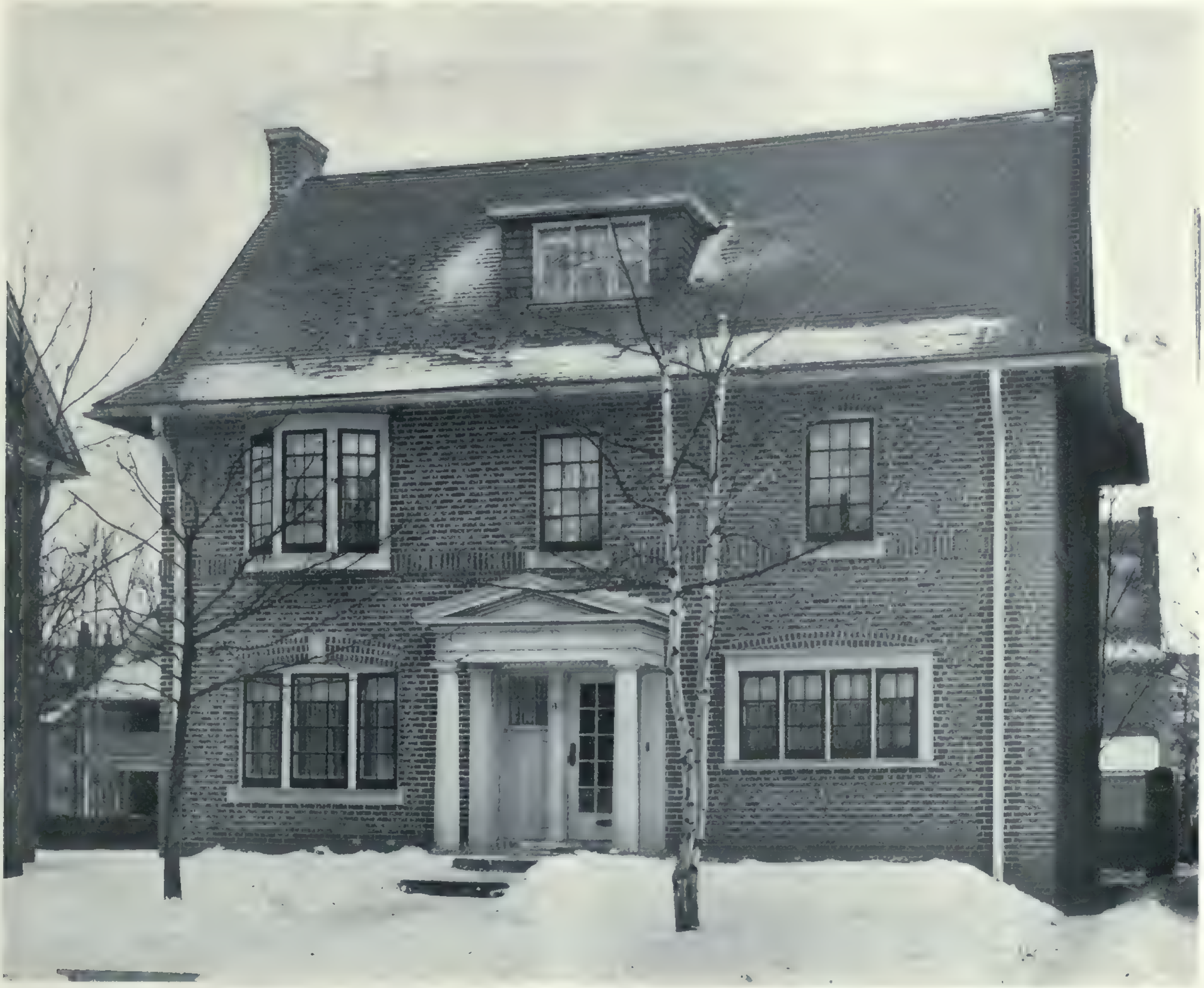
HOUSE AT TORONTO.

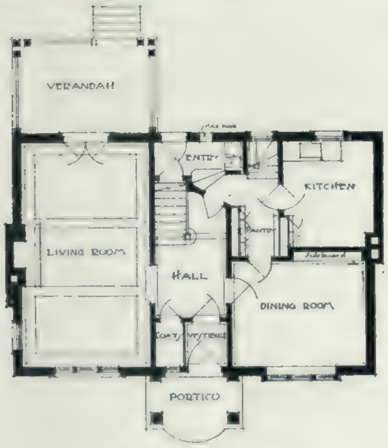
HENRY SIMPSON, ARCHITECT.

Brick exterior. Slate roof. Hardwood finish throughout. Brick fireplace. House is 38 feet wide and 35 feet deep. Cost $8,000.



FIRST FLOOR PLAN.

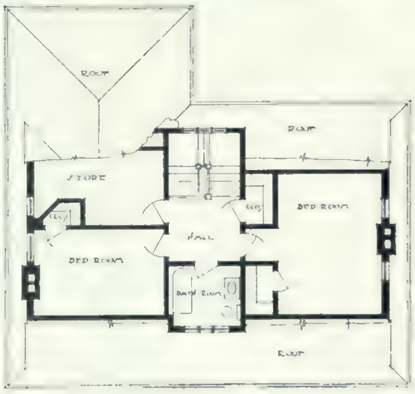




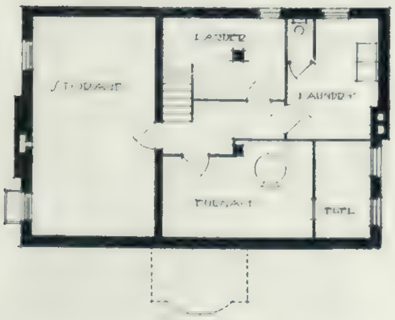
GROUND or FIRST FLOOR

HOUSE AT TORONTO.

GORDON M. WEST, ARCHITECT.

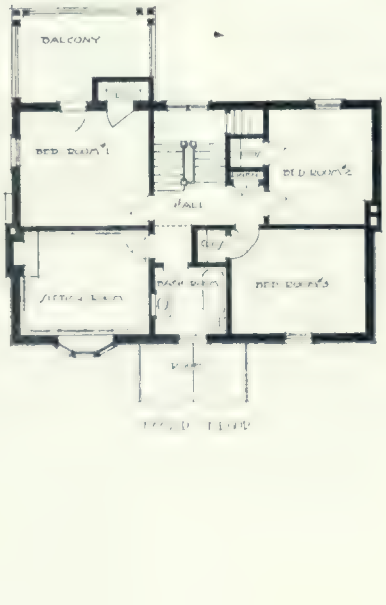


ATTIC

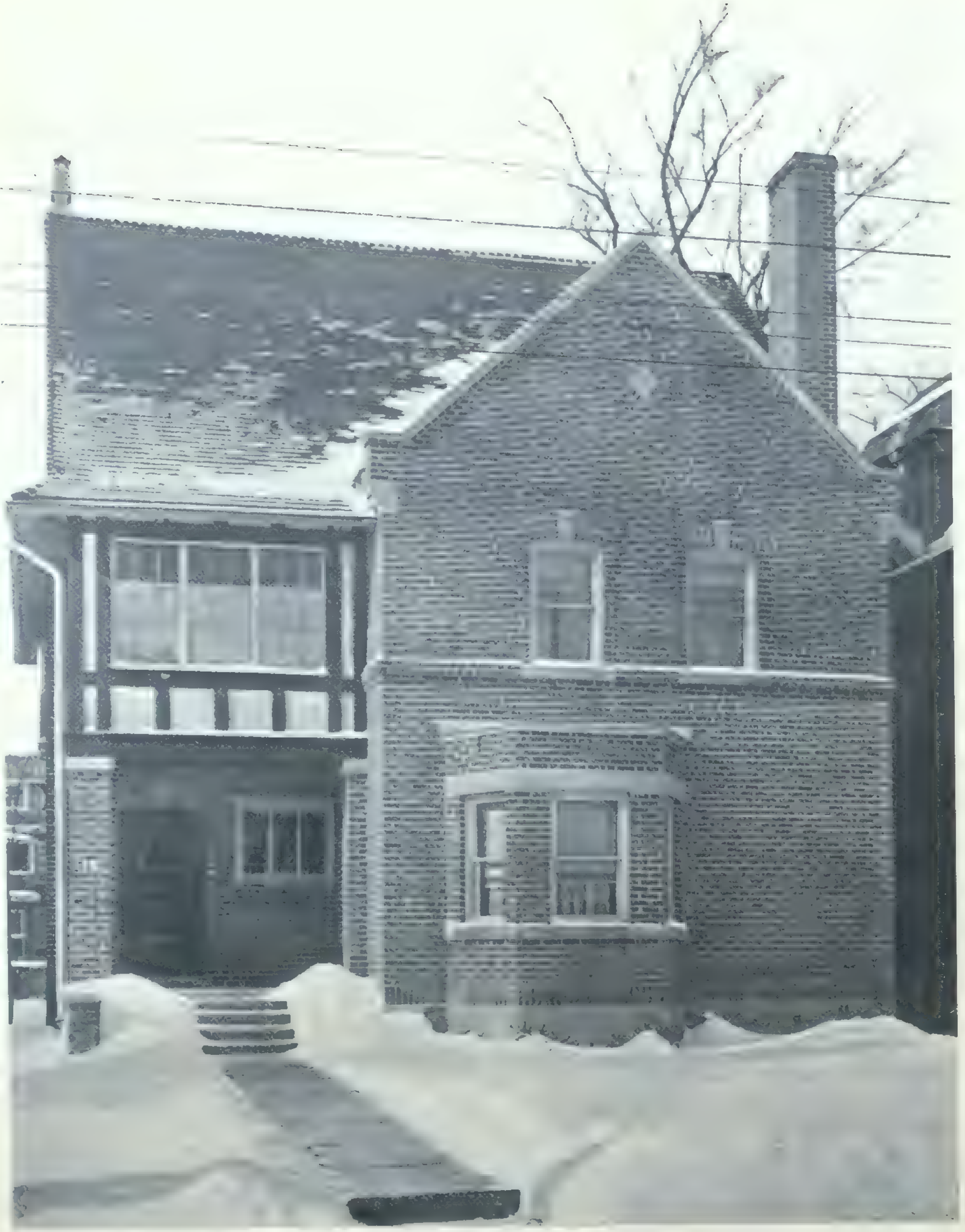


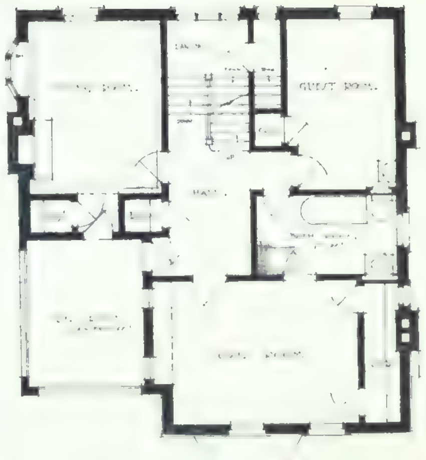
BASEMENT

Exterior of hard red brick, laid in white mortar. Stained shingle roof. Upon the interior the ground floor is finished in birch stained brown; elsewhere sycamore. Five-foot paneled dado in vestibule and hall. Tapestry brick fireplaces. Seven-eighth-inch oak flooring throughout. House i, 38 feet wide and 26 feet deep. Cost $6,500.

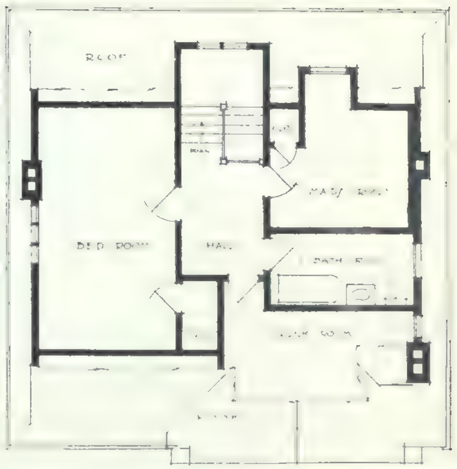


SECOND FLOOR





SECOND FLOOR

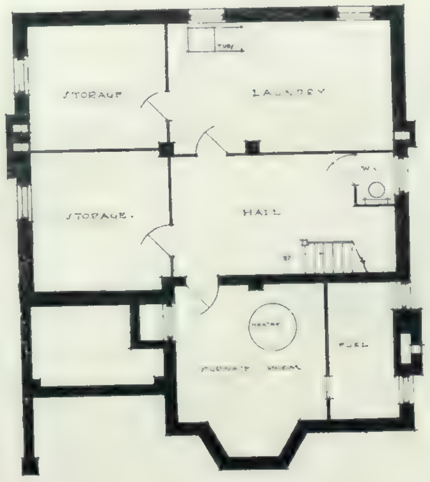


ATTIC

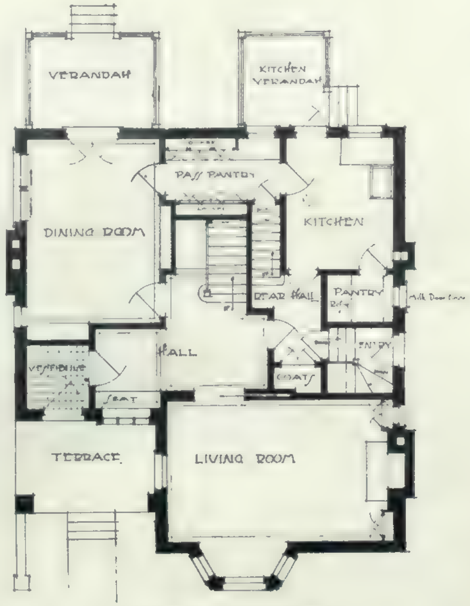
Exterior of selected thick brick with wide white mortar joint. Shingle roof and half-timber work stained. Interior finish of ground floor quarter-cut oak, of second floor pine, stained brown. Oak flooring throughout. Bathroom has tile floor and dado. House is 33 feet wide and 36 feet deep. Cost 19.5 cents per cubic foot.

HOUSE AT TORONTO.

GORDON M. WEST, ARCHITECT.



BASEMENT



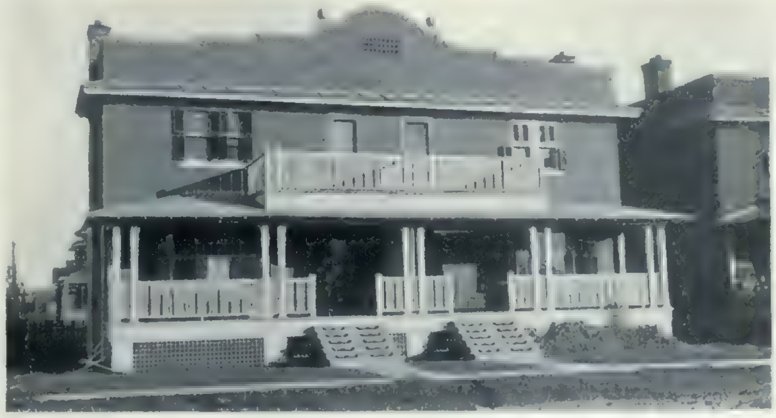
GROUND or FIRST FLOOR

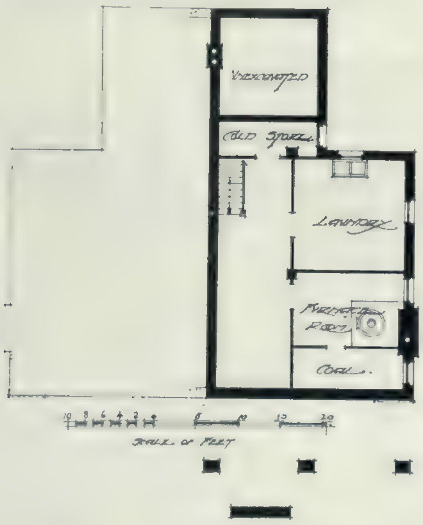
Houses Costing From $2,500 to $5,000*

PHILIP J. TURNER, F.R.I.B.A.

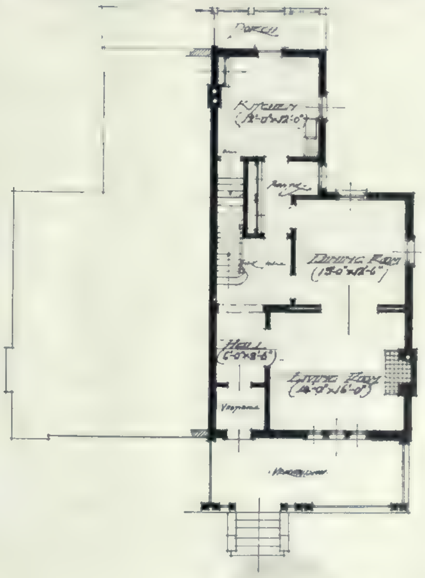
THE HOUSE of moderate cost at the present time is indeed a live topic, especially in a city like Montreal, where so many of the inhabitants are forced to live in apartments and flats, for the simple reason that houses cannot be obtained at a cost that is within the income of the ordinary salaried man.

In the residential districts of Montreal it would be difficult to find any house, however small, that could be rented at a less cost than $50 a month. The smaller modern house with the minimum accommodation sells in Montreal and the adjoining municipalities of Westmount and Outremont (which latter places are favorite residential districts for a great majority of Montreal business people) at a price ranging from $8,500 to $10,000.

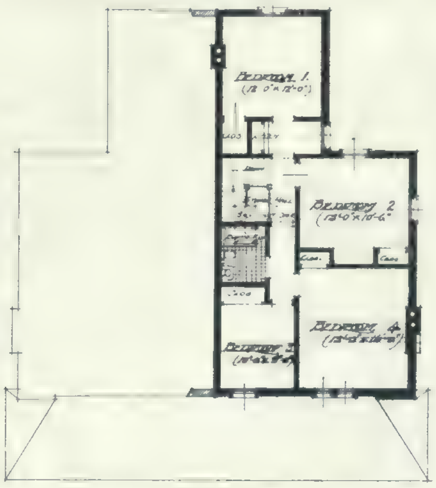




·Basement Plan·



·Ground Floor Plan·

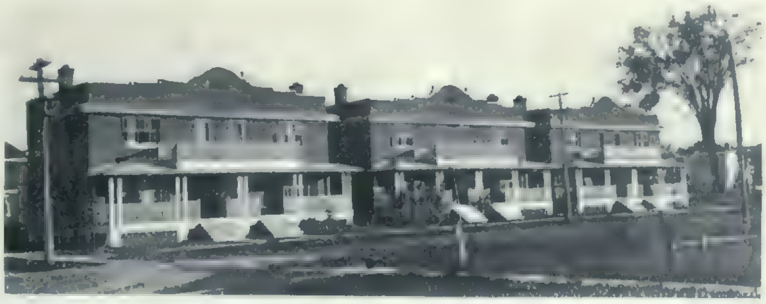


·First Floor Plan·

Consequently, if houses however small could be built and sold profitably at a total cost of from $5,500 to $7,000, it would be difficult for anyone to supply the demand fast enough for such a type of house in the district of Montreal. It is well recognized that building in the metropolis of Canada is more expensive than in Toronto and in other cities across the border to the south of us. Houses can be rented in Toronto to-day in good residential districts at $30 and $35 a month, that would easily command a rental of $40 to $45 if the same type of house and accommodation could be obtained in Montreal.

The reason, amongst others, that tends to make the cost of building more expensive in the Montreal district, is due to the fact that more precautions are taken and extra provisions have to be made against the longer and severer winter of Quebec.

The average person when comparing Montreal figures with others of a warmer climate, does not always realize that the following provisions

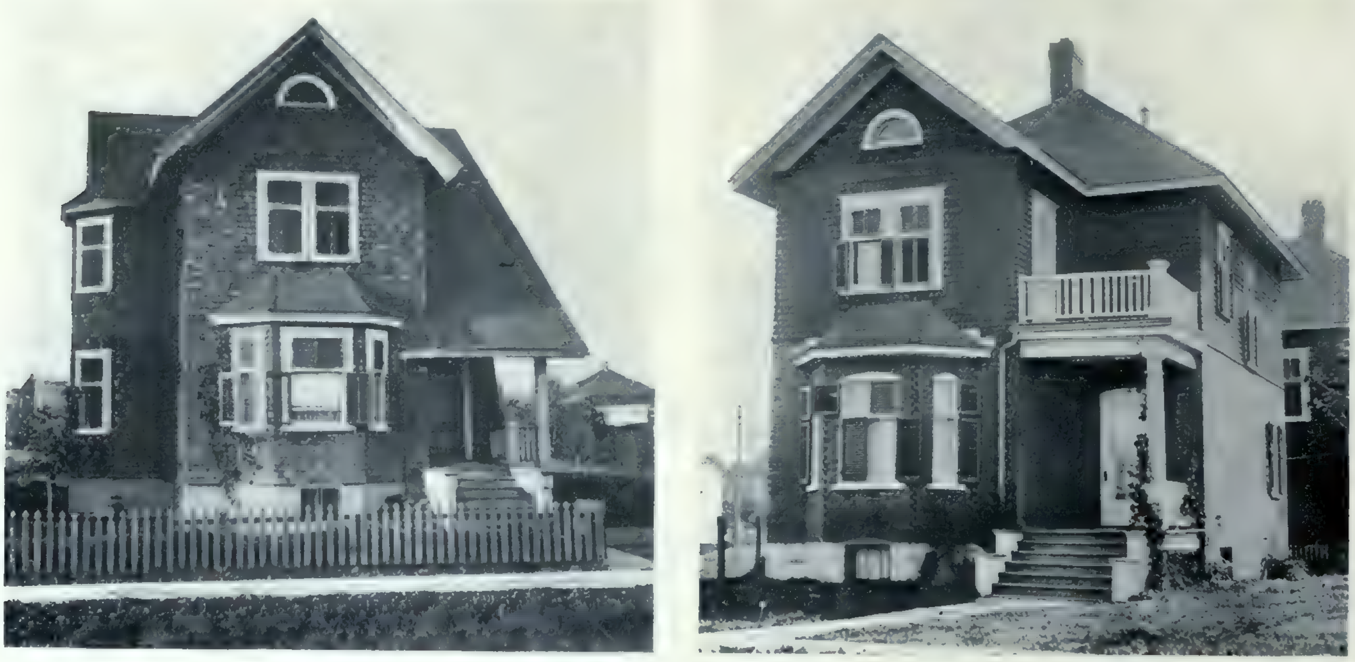


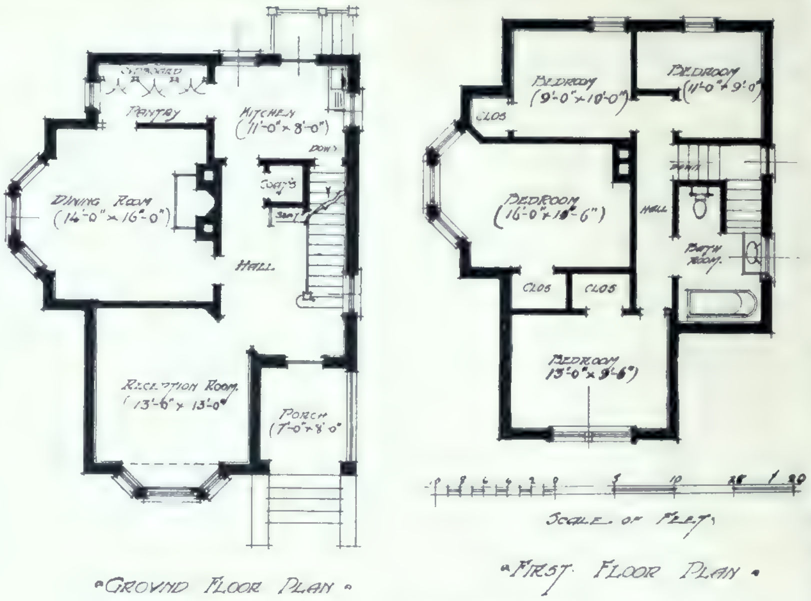
NO. 1.—SEMI-DETACHED HOUSES AT ST. LAMBERT.

---

*All houses illustrating this article were designed by Philip J. Turner, excepting Nos. 5 and 6, which represent the work of Peden & McLaren, architects.

are considered essentials in house building in Montreal and the neighborhood: (a) Double windows or window sashes throughout; (b) double flooring to all floors; (c) a basement throughout the area of the building; (d) double roofing, i.e., a hollow space provided between the two thicknesses of boarding; (e) increased heating, and that on the hot water system, and (f) increased depth to the foundation walls, it being necessary to carry the walls down to a depth of at least four feet six inches to five feet below the ground to escape danger from frost. These precautions are as a rule omitted as unnecessary or are modified in the States and Southern Ontario on account of their winter being less severe.





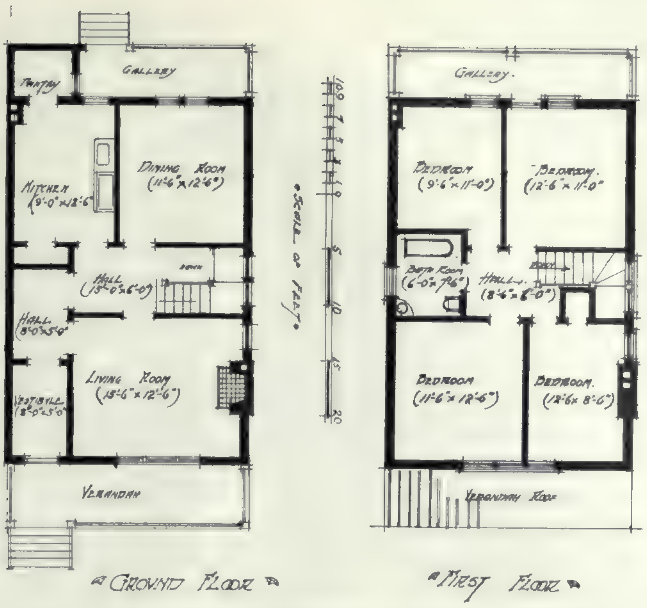
NOS. II. AND IIA.—TWO HOUSES FROM SAME PLANS.

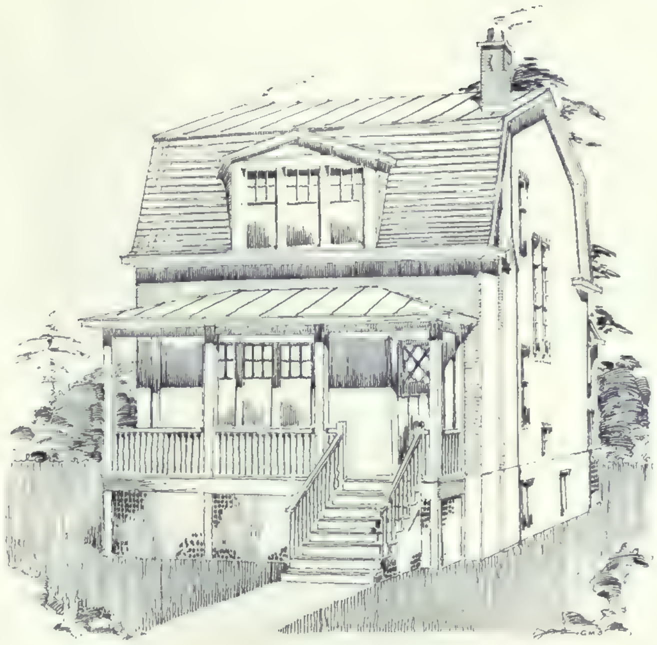
To return to the limits of the cost set down as the basis of this first article, it will be understood, from what has already been said, that very few examples can be found of houses in Montreal or in the district, that have not cost more than $5,000 to erect and complete.

In Westmount, where only solid brick and stone walls are allowed, there would be difficulty in finding any single example, so that illustrations of residences from this district will provide examples for more expensive houses to be dealt with in the second and third papers of this series.

In these articles it is intended to deal only with detached and semi-detached residences, and in this first paper the subjects are selected from Montreal and the neighboring municipalities of Montreal West and St. Lambert. Here solid plank construction with brick veneer for outside walls is permitted and in this way the cost can be kept down a little lower in price than where solid masonry walls only are allowed. Brick veneer houses are warm and durable when properly built and in most localities cost somewhere between the price of frame buildings and solid brick.

Let us study the householder's dilemma as it exists to-day and the difficulties with which the man of small means is confronted. Possibly there never were more architects and more builders than there are now, or more popular magazines being published broadcast which contain illustrations and plans of good houses. It is more than doubtful, however, whether with it all the man who wishes to have a house of his own, instead of a second-hand one, is much further on. He has acquired, no doubt, various odds and ends of information about houses, but



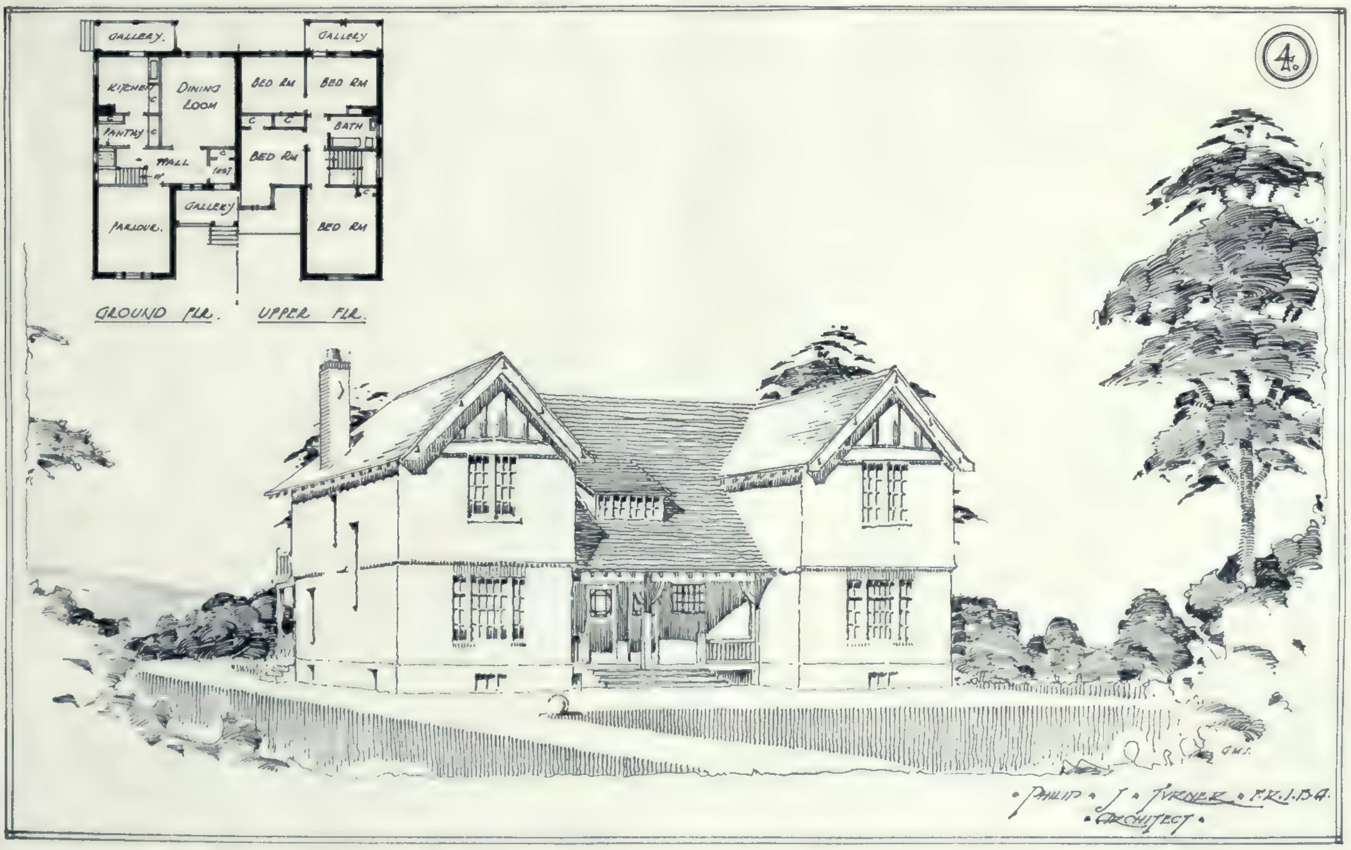


NO. III.—HOUSE ON MAPLEWOOD AVENUE, MONTREAL.

the same difficulty of securing the right kind of architect, the right kind of builder, the right kind of site, and in some cases, the right amount of capital remains.

The average person seems to think that anyone can design a cheap house, but to design one economically and artistically at the same time is one of the difficult problems an architect has to solve: especially is this so when the client of small means generally expects the accommodation that is found in a $10,000 house to be also included in his house that is to cost only half that amount. It is this latter requirement that makes the problem of designing the cheap house on artistic lines more difficult than planning a more expensive one.

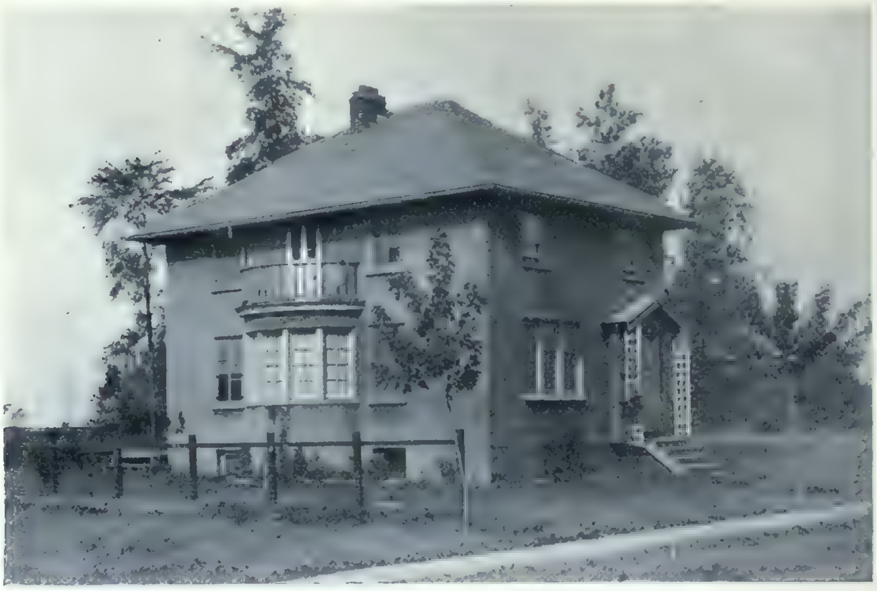
The man who is prepared to spend $4,500 or $5,000 on his home realizes at once the difficulty of the right man to select as his architect. He wants a man who is at once skilful, economical and artistic. The architect endowed with these qualifications, is probably not particularly anxious for commissions of this sort, and if he undertakes it, he expects to be paid,—reasonably enough from his point of view,—on a higher scale than is usual.

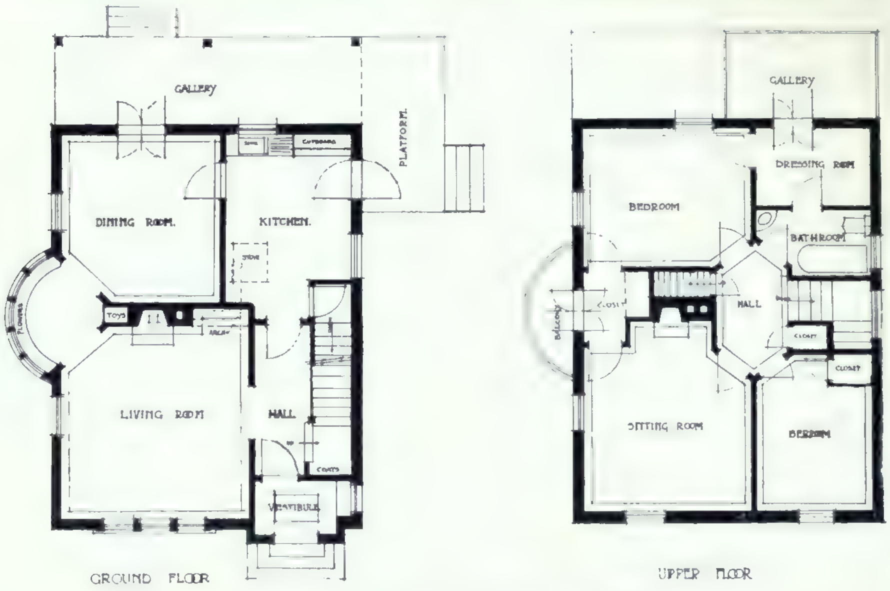


NO. IV.—SKETCH OF SEMI-DETACHED HOUSES.

Our client as a rule cannot appreciate that a five per cent. commission on a $5,000 house is anything but remunerative to his architect, and if the latter is going to give the care and thought that the smallest house design requires in the matter of detail, a far higher scale should be demanded if the best results are to be obtained.

How many of the small houses and cottages that one sees in the suburbs of our cities are spoilt for the want of thought and personal touch of the designer in every detail of its construction. Where the architect cannot arrange a remuneration for his services commensurate with the time and work involved in the carrying out of the work, he will naturally be inclined—rather than to refuse the commission altogether—to delegate the work to one of his draughtsmen with instructions maybe not to give too much time to details.





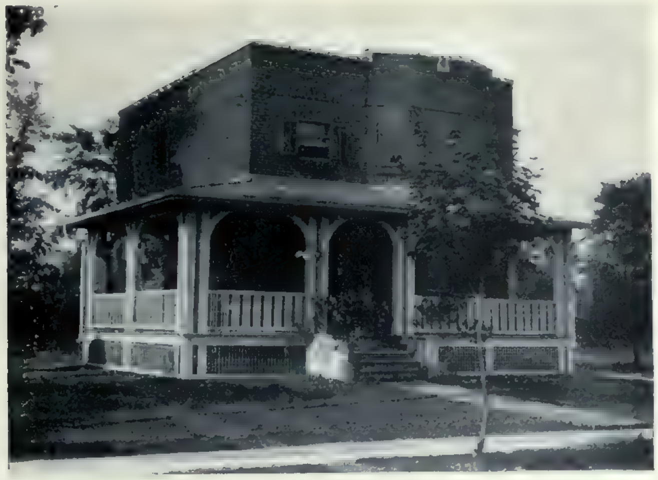
NO. V.—HOUSE AT MONTREAL WEST.

Needless to say, this is not the stand taken by the true artist; but as a general rule it may truthfully be said that the successful cottage of $5,000, carried out with the time and attention given to it by the architect that it requires, is not going to be a "paying" proposition to him on the five per cent. basis. There are very few architects (as will be realized) who can afford to carry out such commissions for the love of their work alone. It has often been said that architecture would be a delightful profession if those practising it did not have to make a living by it, and this same statement applies particularly to the designing and detailing of the smaller house.

The designs of many of the smaller houses surrounding the outskirts of all our cities are very often hideous and at the best anything but beautiful. The public do not realize that but a very small percentage of $5,000 houses in our towns are designed by architects. The ordinary man in the street seems to think that what a well-qualified architect must demand as his fees (namely, six to eight per cent.) on a small house, seems quite prohibitive, consequently his services are often dispensed with, with the result that the designs of small houses erected in our suburbs are, as a rule, disappointing and uninspiring. To anyone endowed with taste, a palpable absence of the artist in *every detail* of the building is also perceived—a failing not found in our best garden cities, where the whole of the cottages, public buildings, and the laying out of the grounds have been studied to the best artistic, and at the same time, economic advantage.

A difficulty also that faces our would-be small house owner is that having obtained the plan of the house he likes, he finds it often no easy task to engage a satisfactory contractor. The contractor in a large way of business is quite above small work of this sort, or if he takes it, he is going to charge extra, and gives it at that, as a rule, no personal attention. The small builder is high-priced because he is short of capital, buys badly, and cannot get good work from an inferior staff.

But one must not multiply the difficulties of any individual of small means building his own home. Such a client will obtain the best value for his money and acquire probably the best solution of this problem when he builds his home on the lines laid down by our best model city companies in their co-partnership schemes; examples of these are to be seen in England at Hampstead, Letchworth, Bournville, etc., and in



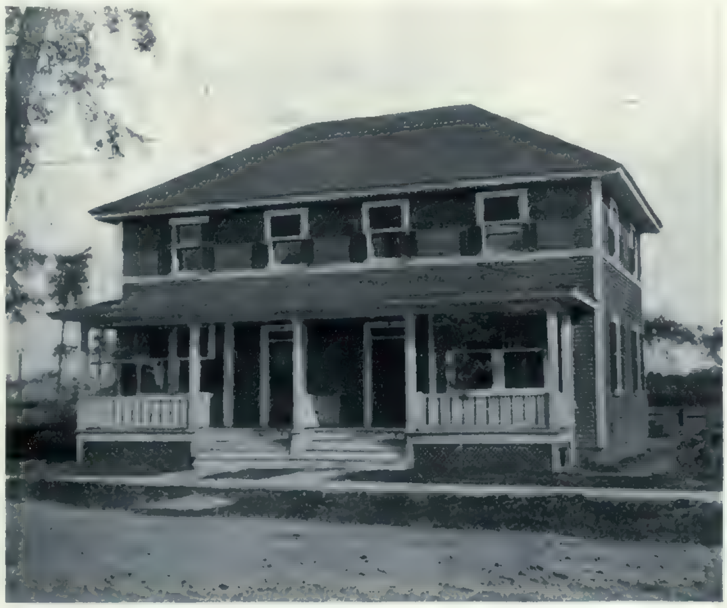
NO. VI.—HOUSE AT MONTREAL WEST.

several cities in the United States. These companies undertake to build and sell a number of houses, designed both artistically and substantially at the figures we are now considering. Where such a company is not "putting up" and selling the houses for pecuniary reasons alone, but for the general welfare of the community, it naturally follows that good results will follow.

An architect, given a free hand as to design, will lay out the property on the most artistic lines, and where a number of houses are built at the same time, good contractors can be encouraged to interest themselves in the scheme, and are also able for the same reason to keep the cost per house at a lower rate than if only one house were built at a time.

If a very small house is required in the country with cheapness of price as the main desideratum, the local builder, working from his own plans, can give more as to quantity than if he were working from an architect's plans. He is afraid of the latter, also of the long and explicit specifications, and is likely for some reason or other to charge high in the first place when estimating from a city architect's plans. It is another matter altogether if what the client wants is quality, and that is what we are considering now.

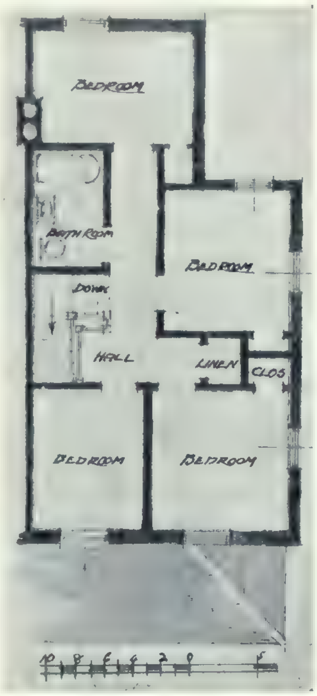
How often has one seen a small house which is designed artistically and planned economically entirely spoilt through its inappropriate surroundings and site. It is one of the most important matters in building a house that the site be first of all well considered, and that its suitability or otherwise be regarded before the same is purchased or the house designed. In this commercial age and owing to the high cost of land, we find sites altogether too small for the setting of a house with proper light and air space around it.



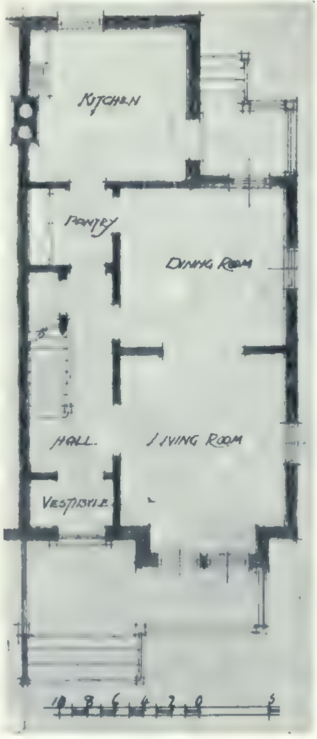
NO. VII.—SEMI-DETACHED HOUSES AT ST. LAMBERT.

Lots of twenty-five feet frontage are altogether too small for detached or semi-detached houses, and subdivisions set out on these lines should be forbidden by law. It would seem that such divisions are merely a bait to catch the interest of the man of small means, for when once he gives attention to the kind of house he wants to build, he will find that he cannot fit his house on to the lot and it will be necessary for him to purchase two lots, making fifty feet frontage, or not build at all.

Thirty-five feet frontage is certainly a minimum lot for detached houses, and even with this width or with anything less than fifty feet wide one cannot "set" a number of houses to good advantage. Houses packed in parallel rows like sardines in a box are not going to give the passerby the idea of comfort and restfulness



FIRST FLOOR.

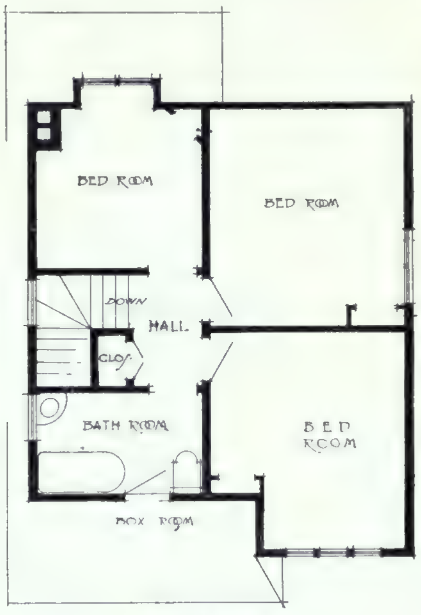


GROUND FLOOR.

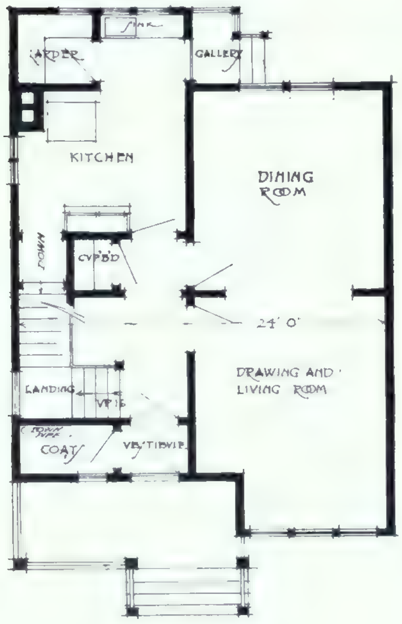
that is to be desired in a home, and a cramped site not only spoils the appearance of the house, but also tells the tale that the man who built the house was also cramped in his finances.

The limit of accommodation to be provided in a small house for present day requirements would seem to be on the ground floor: living room, dining room, hall, kitchen and pantry; on the first floor: three or four bedrooms, bathroom and linen cupboard; in the basement: larder or cool room, furnace room, coal storage, laundry and store for winter sashes and summer blinds.

Though the cost per foot cube is given in several of the examples illustrated, the pricing of a small house on the basis of its cubical contents is no safe guide, as local conditions affect the cost in nearly every case. One must not forget, moreover, how materials and wages have advanced in late years, and that the tendency of all forms of wood construction is to gradually increase as our forests continue to dwindle.



FIRST FLOOR.

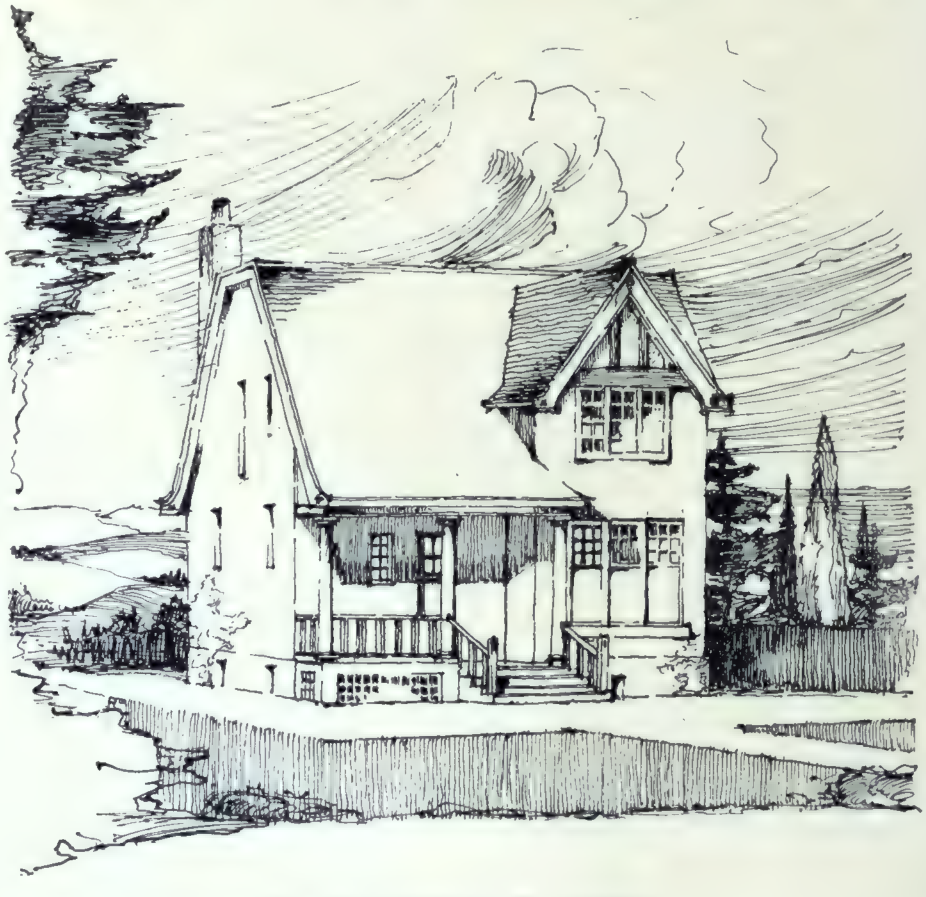


GROUND FLOOR.

Wood framed houses and shingle roofs are generally prohibited by our by-laws, except in the country districts, and rightly so, as more fires occur from flying shingles than from any other cause. For small frame houses ship-lap or boards tongued with rebated battens to shed rain are the most economical exterior covering. Shingles have nearly doubled in cost the last twenty years, but cost no more than the thin painted lapped siding or clap-boards. In the long run, the cost of painting the latter causes them to work out no cheaper than roughcast or cement on metal lath.

The ordinary plain brick house costs on an average about twenty per cent. more than frame and roughcast, and the combination of brick below and roughcast above will cost as much as the all brick building, though the former can be often made the more picturesque.

After everyone has said everything that there is to be said on the building of small houses, the fact still remains that houses are to be built to live in and not to be looked at, and whilst always endeavoring to obtain beauty in the design, the first and final object to be obtained is that the house, however small, should be well built and well planned.



NO. VIII.—HOUSE AT ST. LAMBERT.

Every house owner, architect and contractor, moreover, should work together so that they may produce all the desirable qualities referred to in the house described in "The Private Papers of Henry Ryecroft": "My house is perfect. Just large enough to allow that grace and order in domestic circumstance; just that superfluity to lack which is to be less than at one's ease. The fabric is sound; the stairs do not creak under my step. I am waylaid by no unkindly draught; and I can open or close a window without muscle-ache."

A brief description is given of each house illustrated in this article.

No. 1.—Three pairs of semi-detached residences, St. Lambert, Montreal. These houses were erected on the Brooklyn Park estate in 1910 at a cost of just under $4,000 each. The walls are of three-inch solid plank with pressed brick veneer. Each house has a frontage of 23 feet 6 inches, and hot water heating. The pantry being situated between the kitchen and the hall and dining room prevents unsavory odors penetrating into the rest of the house. Asbestos slates are used on the gallery roofs. This plan is very compact, no waste space being taken up by passages. The cost of these houses amounts to 15 cents per foot cube.

No. 2.—This cottage was built in 1911 at Brooklyn Park, St. Lambert, at a cost of $4,150, concrete basement and hot water heating included. The walls are of wood framing, boarded, and covered with shingles treated with a brown creosote stain.

No. 2a.—This house is an alternative elevation from plan No. 2. Shingles on the upper level, and brick below. The cottage, which was erected without architect's details, would have been much improved if the junction of the shingles and bricks had occurred at the horizontal line of the first floor window sills, and if the bottom courses of the shingles had been brought out with a good projection. The jagged corners of the bay window, so common in speculative work, should never be permitted in good work.

No. 3.—A compact square plan of 22 feet frontage, one side wall being a party wall. The bathroom, although provided with a window, is also planned with a top light in the event of another house being built close up to it. Complete cost with heating, $4,189, or 20 cents per foot cube.

No. 4.—A pair of picturesque semi-detached houses costing $3,500 each. Brick on ground floor, cement roughcast on metal lath to upper floor, shingled roofs.

No. 5.—Erected at Montreal West in the winter of 1909-10, this house is a marvel of cheapness, costing in all $3,498.15. The figures of the different trades are interesting: Mason and brick, $459.45; carpenter, $1,639.57; roofer (slate), $182.00; plaster, roughcast, $399.00; painter, $282.59; plumber and hot water heating, $438.76; hardware, $48.85; electrician, $46.91, making a total of $3,498.13. The walls are of plank and brick veneer. The flower window is a pleasing feature and relieves the plainness of a square house. The appearance would have been further improved if the chimney had been raised.

No. 6.—This house was erected in Montreal West at a cost of $3,681.50, exclusive of the hot water heating, which was installed by the proprietor.

No. 7.—These cottages, erected in 1910 at Brooklyn Park, St. Lambert, are of wood framing and clap-boarding, with shingled roof and hot water heating. They cost $2,100 each. The building is supported on concrete piers with cellar under back portion only. Cost per foot cube, 12 cents.

No. 8.—This house, designed for St. Lambert, Montreal, with walls of roughcast on metal lath and shingle roof, a basement and hot water heating. Builder's contract sum, $2,950 complete, which is equivalent to 16 cents a foot cube.

COTTAGES NEAR RUGBY, ENGLAND, BY E. L. LUTYENS, ARCHITECT.

Heating The Small House

THE ECONOMICAL and effective way of warming the house is by means of a central heating plant. The initial cost of installation may be quite expensive, but eventually it will prove a saving proposition. Three systems—warm air, hot water and steam—are used with various changes in each one. For small houses the low pressure hot-water has proven quite satisfactory. The hot water is generated in the boiler, conveyed to the highest point of the system by the main pipe, from which branch feeders connecting the various radiators. A return pipe takes the cold water back to the boiler. Several feet above the system is located the expansion tank, which acts as a safety valve.

The warm-air furnace is most generally used, the fresh air entering from the outside above ground through a cold air box. In this system it is advisable to place the furnace in as central a position as possible in order to have the pipes of uniform length, although it may be conveniently placed toward the north in order to shorten the warm air pipes leading to the north and west rooms, and using the long pipes for the other sides, which are naturally warmer.

Steam heating has many characteristics of the hot-water system although distinctly different. The main flow pipe is carried to the highest point of the basement, with distributing pipes running at slight inclines and finally connecting with the boiler below the water line. Risers containing flow and return connect the radiators with the distributing pipes.

The chimney is an important part of the heating plant and should either be round or square, as the smoke and gases rise in a spiral manner. It should be ample in size and no flue should be less than eight inches square or eight inches in depth. Built at least two feet above the high point of the roof, it prevents any cutting off of the draft from wind blowing over the roof. The flue should be kept clear of all obstruction, the smoke-pipe kept to the inner side of the opening, the foundation of sufficient strength to prevent settling and cracking, and the furnace within six feet of the chimney.

Table of Chimney Flues. By A. G. King.

Cubic feet—contents of building.	Sq. ft. direct steam radiation.	Sq. ft. direct hot-water radiation.	Round tile or iron. Inside diam.,sq.in.	Square or rectangular tile or brick.
10,000- 20,000	250- 450	300- 800	8	8x 8
20,000- 45,000	450- 700	800-1,200	10	8x12
45,000- 75,000	700-1,200	1,200,-2,200	12	12x12
75,000-140,000	1,200-2,400	2,200-3,600	14	12x16
140,000-200,000	2,400-3,500	3,600-5,200	16	16x16
200,000-300,000	3,500-5,000	5,200-8,000	18	16x20

In estimating the requirements for the various rooms to be heated, C. S. Prizer furnishes the following method: "To the actual cubic feet of space in each room add 75 cubic feet for each square foot of glass surface and eight cubic feet for each square foot of exposed wall surface. For a northern or western exposure add ten per cent. to glass surface and ten per cent. to exposed wall surface. For a southern or eastern exposure deduct ten per cent. from both the glass and exposed wall surfaces." Outside doors are measured as glass. The above rule provides for a temperature of 70 degrees within and zero weather without. The furnace naturally must be rated in equivalent cubic feet.

After the size and character of the furnace has been established care must be taken as to the size and method of installing the warm air pipes and risers as well as the location of the registers. In addition to the warm air registers in a small house there should be two floor outlet registers in order to properly warm the space as hot air will not enter an airtight room. Through these floor registers the air passes down the circulating pipes to the furnace for reheating, after which it is taken to the rooms again by means of the warm air pipes and registers. The cold air is brought into the cellar through a screened window opening into the air box, which is provided with removable baffles of stretched cheesecloth. The incoming air strikes at right angles the baffles, which extract all dust and other foreign matter.

In case a ventilating flue is desirable it should be placed next to the chimney flue in order that the warmth may give the air an upward tendency. In case outlets are made into the flues care should be taken to select a valve which will prevent back currents of smoke from being driven into the rooms.

Recent experiments show that fine hard brick absorb practically five per cent. of their weight of water, while soft brick take up forty per cent. Since one heat-unit is required to raise one pound of water one degree of temperature and the same amnuot of heat will raise five pounds of dry masonry one degree, it is readily seen how necessary it is to note the quality of the brick. If the building is of concrete special attention must be made as to whether it has been waterproofed or not; also if plastered directly on the concrete or if studded and lathed inside the concrete wall. If studded fifteen per cent. increase will be sufficient if finished by the other method, sixty per cent. will not be too much allowance for wet windy weather. Water is the greatest absorber of heat, so a building constructed of such materials needs more warmth.

The Garden City Movement

THE GARDEN CITY idea is a world-wide movement which is rapidly re-organizing social tendencies in every country. It is bringing about a wholesome condition with the prime object of accommodating the tenants in as economical a manner as possible. It also aims to furnish a better understanding between the classes, removing some of the big barriers that tend to keep humanity on a low moral basis. The suburban idea grants like advantages to business men and women as it does to artists and professionals. Here the single room may be a "Spanish castle" with the essential privileges of freedom, light and air as well as the large expensive home.

All great improvements have to go through an extended period of agitation and apparently insurmountable obstacles in the gradual progress of civilization. But after years the Renaissance comes and we are privileged to enjoy the blessings which our stunted natures prevented for so long a time. That a change in our social and industrial conditions had to come has been a recognized fact, but the method of accomplishing this much needed reform is and has been a serious problem. It is safe to say, however, that wonderful strides have been made in the right direction and that nothing will tend to clarify the atmosphere of unrest as much as the garden city movement.

WORKMEN'S COTTAGES AT EARLSWICK, ENG.

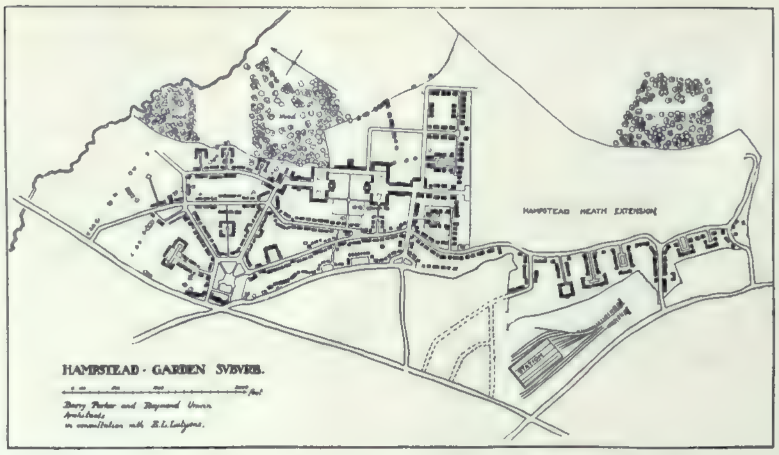
As has been stated, plans throughout the world have been made to re-organize great cities with a view of abolishing the slums and affording healthier conditions of life for the people, especially the poorer classes. The heads of great commercial organizations realize that it is to their interest to provide their employees with healthful and comfortable surroundings. A movement to encourage the people to remain in the agricultural districts is growing in every country. All of which lead to one goal—the creation of an environment which will give the coming generation a healthful, moral and economical living.

It might be interesting to note the effect of pure air and light upon human beings as shown in a recent study of English conditions. At Letchworth, where was born the garden city movement, it was found that the height, weight, general health, and mental capacities of the boys and girls showed a far higher average than that of the children in crowded parts of London, Birmingham and Liverpool. Since these comprehend the essentials of life, the conclusion to be deducted is quite apparent. It should bring about a more consistent effort on the part of every one interested in the sane and healthful progress of mankind.

Undoubtedly the moral tone of a community is regulated to a certain degree, at least, to the cleanly and healthful atmosphere surrounding it. With playgrounds affording all kinds of amusement, with homes beautified with lawns, trees and flowers—what could be more conducive of clean thinking and actions? The freedom and saneness of a garden city lends itself to the fundamental principles of right living. Selfishness, jealousy, and bitterness is replaced by mutual understanding and helpfulness towards each other. The filth and wretchedness of the slums will soon be a shameful condition of the past. Forty years ago Berlin banished her slum districts, the centre of Glasgow has been re-modelled, Paris has and is doing more for her poor than any other city in the world, Vienna is re-planning her crowded sections; in fact all living cities are wide-awake to the moral uplifting of neglected parts.

As for the economical side, this phase alone warrants a continuation of the work already started. We are not only confronted with the problem of housing properly the people of to-day, but must anticipate the needs of the vast horde of immigrants scattered throughout our provinces each successive year. The speculative concerns cannot create fit homes for the workingman at a reasonable price. His ambition to rob them is too well founded. We must look to men of broader vision who feel something more in life than the mere accumulation of wealth. That such men exist is exemplified in the work which is already being accomplished in the various cities.

A description of various schemes, together with illustrations, is given in condensed form in order to show what is being done. Other ideas will be reviewed later—all of which contain suggestions which may prove helpful in the working out of future problems.

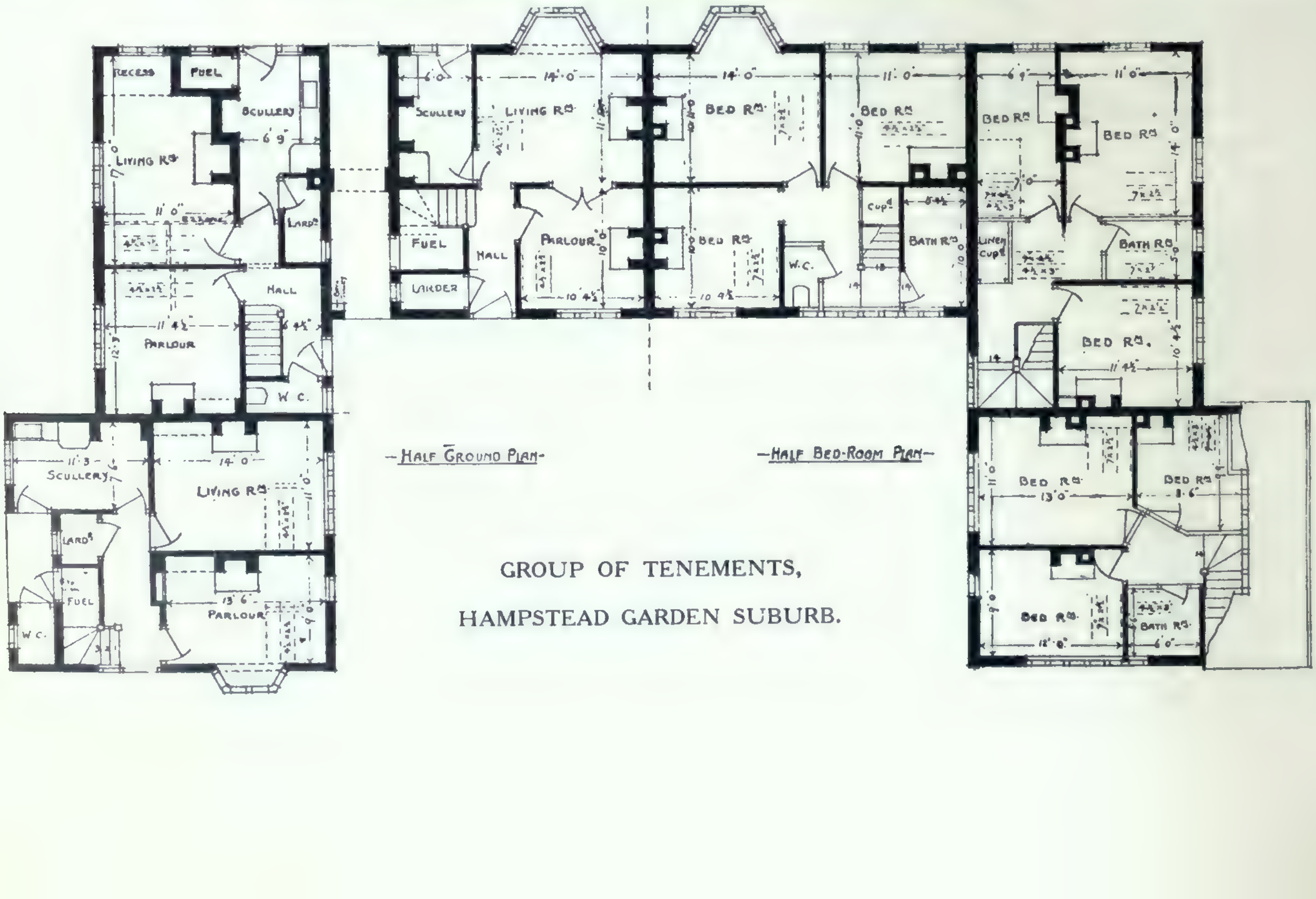

HAMPSTEAD HEATH EXTENSION
HAMPSTEAD · GARDEN SVBVRB.
feet
Barry Parker and Raymond Unwin
Architects
in consultation with E.L.Lutyens.

The Hampstead Garden Suburb.

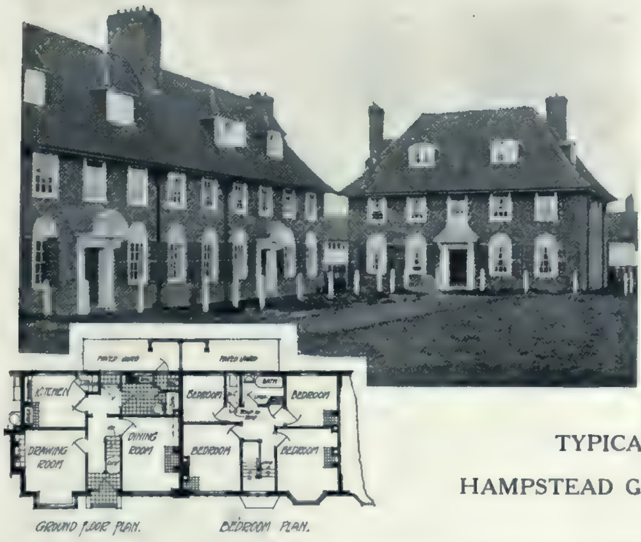
One of the most striking examples of the garden suburb is at Hampstead, England. After a remarkable growth of five hundred homes in two years, it continued to satisfactorily meet the needs of the people and new area had to be added to the original tract. The location is especially favorable, being the highest site near London and of an undulating nature, while the famous Heath precludes all chance of despoliation from the hands of the speculative builder. Hampstead Heath, associated with such well known characters as Dickens, Keats, Shelley, Constable and others, will always be preserved as an open space. The large houses surrounded by gardens from one to three acres, face the Heath, while the smaller homes are located farther back. The northern section is given over to the workmen's cottages, singly and in groups, with ample space for gardens, orchards, playgrounds, etc.

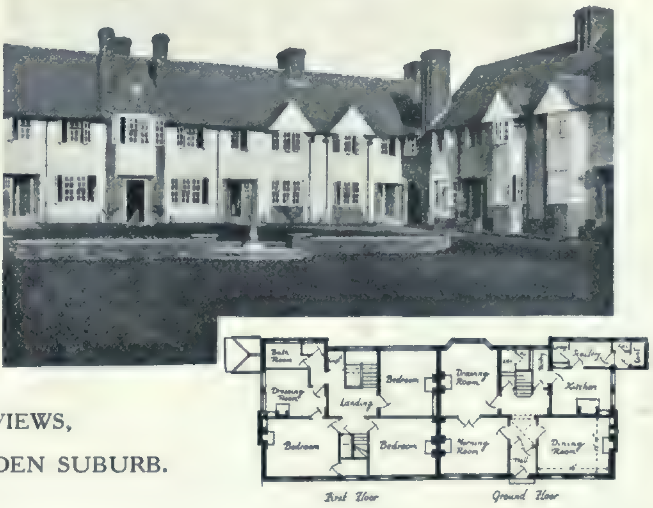
The scheme was started by a body of private and public spirited citizens some ten years ago who purchased 240 acres at a cost of $560,000. After forming the Hampstead Garden Suburb Trust competent architects were selected who laid out the present arrangement. As new buildings were erected considerable care was taken to conform the new project with the general surroundings, which resulted in a free and natural arrangement, as the trees and hedges already developed were not to be changed at all. If the plan did not conform to the position of a tree then the work of the experts had to be changed, which resulted in streets and driveways following the hedges. As a consequence this new colony has an appearance of age and dignity. According to English laws, the buildings are of stone, brick or cement. The roofs are usually of dull red tile, which harmonizes with the warm brown effect of the cement walls.

A notable feature



GROUP OF TENEMENTS,
HAMPSTEAD GARDEN SUBURB.

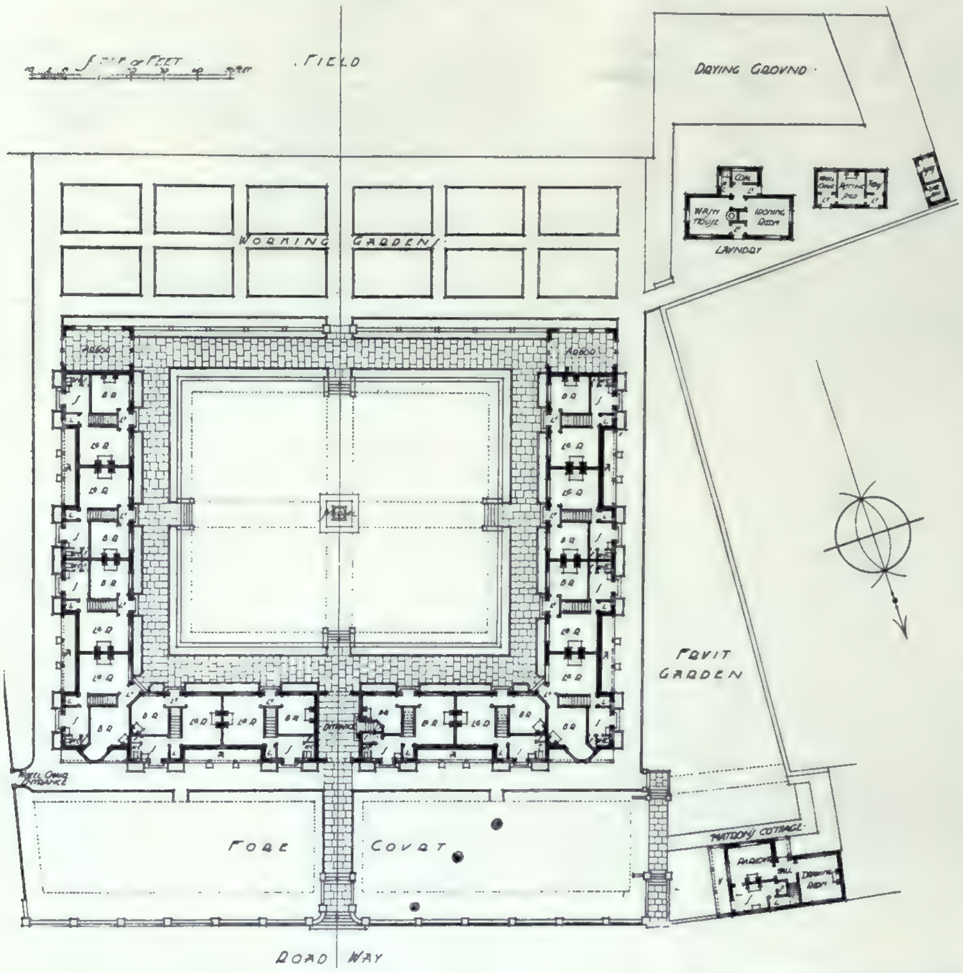




TYPICAL VIEWS,
HAMPSTEAD GARDEN SUBURB.

of this scheme is the pleasant mingling of all classes. The members of the Trust felt that society is impoverished by class distinction and each in turn suffer through ignorance of conditions aside from their own. From the first the principle was established that all buildings be made attractive, each with its own distinctive character. All homes had their own gardens, and when a group of houses was planned under one roof a larger space was allotted. In order that plenty of pure air and open views be maintained, an Act of Parliament limited the number of houses on an acre to twelve.

While one may pay any rent desirable, it is interesting to note the many groups of workmen's cottages which average approximately one dollar and fifty cents a week. As per conditions, all of these are well built and thoroughly sanitary. One large quadrangle accommodates sixty self-supporting women, who have the conveniences of individual homes and also the privileges of a boarding house if desirable. Another provides for young men similar to a college dormitory, while a third is given up to single room tenements. The majority of dwellers are working men in the heart of London, and when we stop to contrast this life to that of a city tenement, it is possible to appreciate what a great boon to mankind such an undertaking offers.

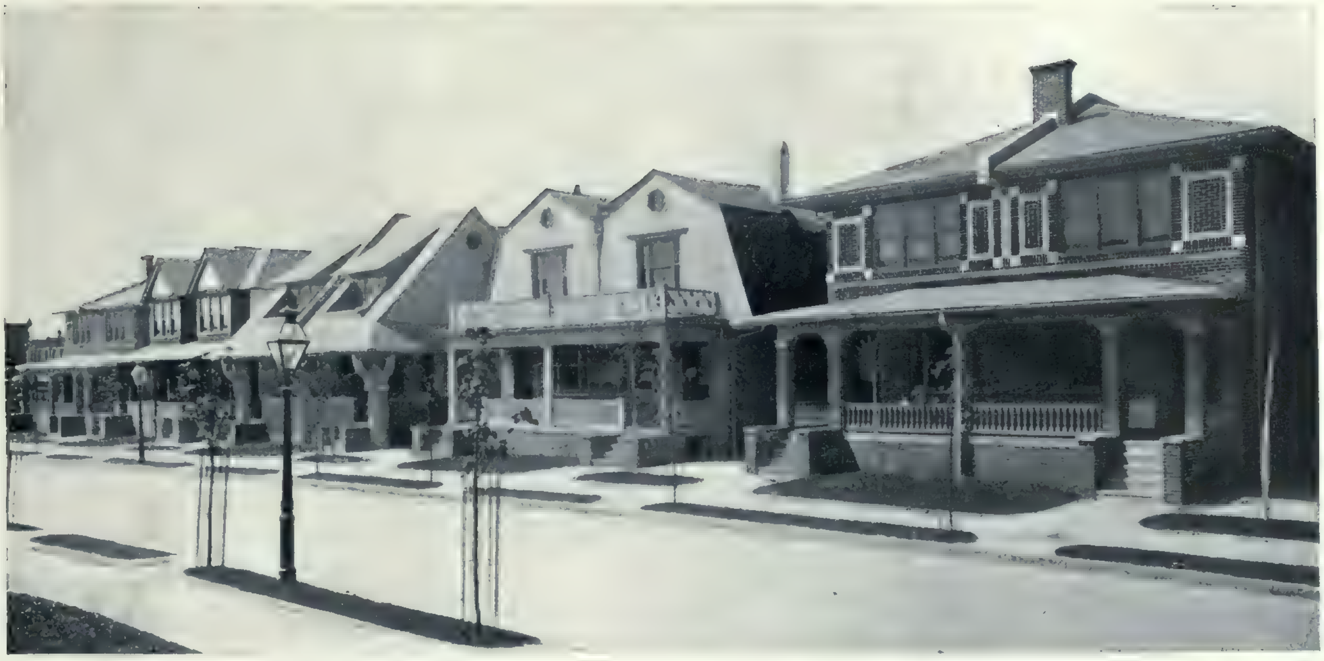


CHURCHILL COTTAGE HOMES.

Port Sunlight Cottages.

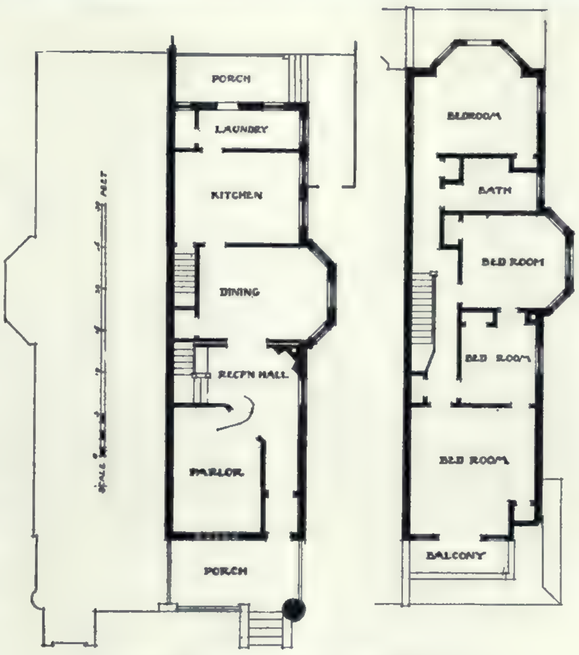
Another type of industrial village is located near Chester, England. During the years of growth utility has been the main consideration, while the artistic and beautiful were thought of only in the sense of usefulness. Two types of houses have been used; the "cottage," which rents for $1.00 per week, and the "parlor house," at $1.30. In the "cottage" the ground floor contains a living room 15 by 18 feet, behind which is a scullery 9 by 3 feet, and a bath room 6 feet long; while the first floor has three bedrooms, each one equipped with a fireplace. The "parlor house" is planned to accommodate on the first floor a parlor 13 by 13 feet, kitchen of similar dimensions, a bath, scullery and pantry; the second floor possessing four bedrooms. Here, as elsewhere in England, wooden structures are prohibited by law; red brick, rough cast and half timber being used extensively.

In planning the homes, special attention is given to the general surroundings. In order to maintain a uniform beauty and neatness the front garden of each home is kept in order by the village authorities,



at an expense of approximately six cents a week. Plenty of space is granted to the tenants for the raising of fruit and vegetables or the keeping of poultry; also to the children for football, cricket, tennis and bowling.

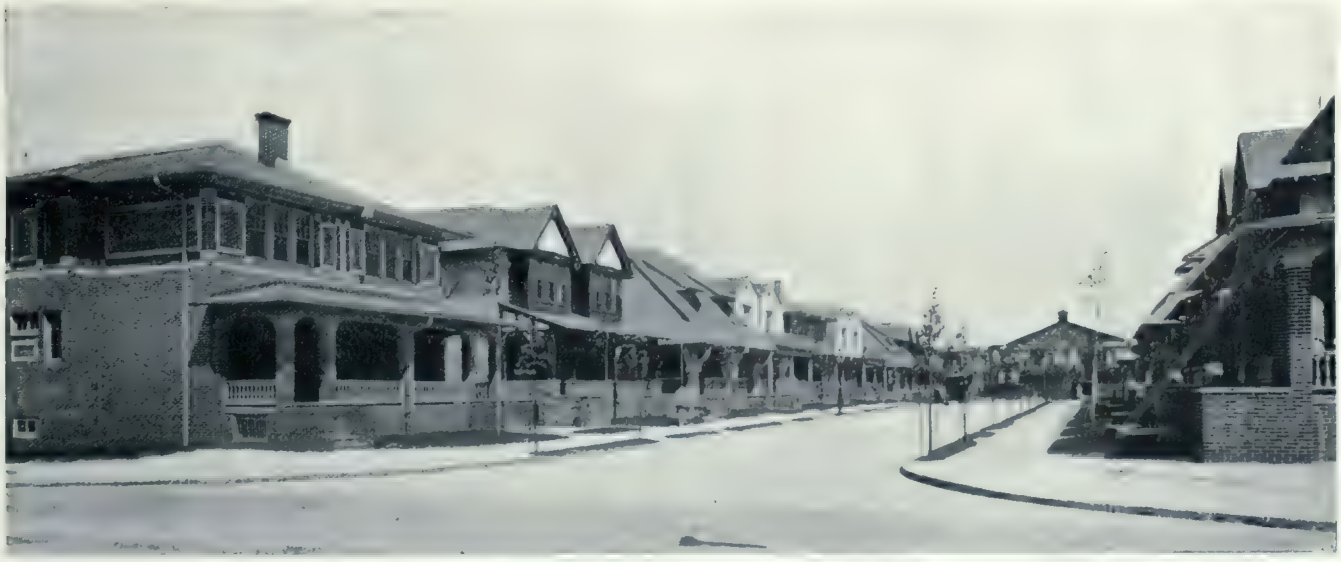
The village represents an outlay of $1,750,000, on which the promoters receive no return, as the rents are based on the actual cost of maintenance, taxes and repairs. The "cottage type" costs approximately $1,650, while the "parlor house" is around $2,750. The value of the land is $1,200 per acre, each accommodating ten houses and ample garden space.



FIRST AND SECOND FLOOR PLANS.

The Girard Estate.

The Philadelphia Board of City Trusts, upon the death of Stephen Girard, had entrusted to its care large tracts of land located within the city limits. Part of the estate was practically useless and necessitated considerable filling-in to fit it for commercial purposes. The Board decided to erect eight hundred dwellings upon a section three miles from the centre of the city, constructing same with the



TYPICAL VIEWS OF GIRARD ESTATE HOUSES.

idea of permanency and also with a view of minimizing maintenance cost.

In order to eliminate the monotonous effect produced by rows of houses, distinguishable only by the street number, eight different types of dwellings have been designed. The various kinds follow each other in a natural sequence, two houses with same exterior being placed side by side. Not only does the style vary, but the materials change to suit the character of the design—tapestry and Roman brick, roughcast and rubble stone predominating.

ILLUSTRATIONS ON THIS PAGE ARE TYPICAL OF THE WORK DONE IN PORT SUNLIGHT.

One of the features in connection with the scheme, worthy of special mention, is the power plant located within a short distance of the tract and supplying the houses with heat, electricity and hot water. All of which is furnished free of extra charge; in fact the only expenditure the tenant has to meet in addition to the rent is the gas for the ranges. The amount of rental is based upon the cost of construction and on the contribution which the power plant is forced to make for the continual comfort of the occupants. The houses range in cost from $2,200 to $3,200, including all fixtures, painting and tree-planting. Such home-planning cannot help but bring the living expenses within the limits of the poor, produce a sanitary and wholesome condition, and enhance the æsthetic appearance of the residential districts.

The Churchill Cottage Homes.

A few years ago an interesting venture was made by a philanthropic citizen of England who built in Somerset a house accommodating twelve families. The building was erected around three sides of a quadrangle one hundred and twenty feet square. The open side is enclosed by a low brick terrace wall with a fine wrought-iron gateway giving access to the working gardens provided for each family. Surrounding the quadrangle are low walls with steps leading to the sunken garden.

On the north side is a forecourt 200 by 50 feet, five feet above the road level, and laid out with walks, grass plots, flowers and shrubs. The walls are of sand faced brick, roofs of red tile,

woodwork of oak. Each house has upon the ground floor a living room, bedroom, scullery and larder; on the first floor a bedroom, and large store room.

A consistent effort was made to preserve the quiet charm and character of the English homes and no part of the undertaking was slighted—the minutest detail receiving the most careful consideration. To the north-east is a matron's cottage with two sitting-rooms, kitchen, three bedrooms and bath; while to the south-west is a fully equipped laundry.

The building cost $55,000, furnishings approximately $10,000, gardens, etc., $4,500. Each occupant being a deserving person, is given a weekly sum for maintenance.

THE CHIEF OBJECT of the promoters of the garden city idea has been to bring about a spontaneous movement of the people back to the land by creating conditions that will give them the advantages of city and country life combined, and to keep the whole thing on an economic basis that will afford comfort and prosperity to people of very moderate means. This is done by purchasing a tract of undeveloped agricultural land and building upon it a town or village that is planned as a whole and built without the disadvantage of having to overcome bad existing conditions. This means a great saving from the beginning and, as ground rents are all based upon the original value of the land and the greater part of the revenue derived from the rental of buildings is applied to the improvement of the town, the shareholding tenants naturally receive pretty good returns from their investment. The Co-partnership Tenants' Societies are co-operative associations which build and own cottage property developed on garden village lines and held in common by the society. They are the latest outcome of the co-operative idea which in its youth, in the days of Robert Owen, dreamed of the ideal community, but the communities that attempted to put it into effect failed because they were the result of despair with general conditions rather than of any hope of altering them. They were to be a refuge from the world and were to be self-supporting. The modern Tenants' Society recognizes itself to be only a part of the larger community and is based upon the truth that the recognition of obligations toward one's neighbors develops the spirit of citizenship toward the larger whole. There are already in England ten of these societies, affiliated with a central society which organizes all the business dealings. This central society has, for example, a central trading department which enables the affiliated societies to pool their orders and buy their building materials more advantageously in bulk than would be possible if they worked independently, to avail themselves of the services of the best architects and builders, and to do everything on a large scale. All the tenants are shareholders and the rules of the society provide for an equitable sharing in the advantages of all profits and also for security against loss in the event of death or removal. Without them the garden city movement would hardly have developed as rapidly as it has, but with them there is practically no limit to its far-reaching influence.

HOUSES IN PORT SUNLIGHT, ENG.

Mr. Ebenezer Howard, in a little book entitled "To-morrow," about ten years ago evolved the commonsense scheme—not a new proposition, but one formed from the strongest features of three old ones—of developing along sound economic lines the building of garden cities and suburbs which should combine the advantages of town and country; adding to this a practical working plan by which these might be built largely by the tenants themselves.

COTTAGES IN EARLSWICK VILLAGE, ENG.

We who are interested in civic improvement on the American continent would do well to add to our plans for magnificent parkways, costly boulevards and great city extensions some consideration of the significance of this garden village movement and what it would mean if it were introduced and put on an effective basis in this country.—*The Craftsman.*

How to Get Cheap Houses*

G. FRANK BEER

SOME OF THE ELEMENTS entering into the construction of cheap houses are: (1) Cheap money, and an ample supply of it; (2) Cheap land; (3) Cheap building material; and (4) Cheap labor.

I put these in the order of their importance. As I do not believe in cheap labor, I probably should not have included this at all. Labor today is not overpaid except in cases where it is inefficient, so that all we should do to economize in this regard is to see to it that we get proper workmanship.

The question of building material will be dealt with by others in the discussion to follow. We can hardly hope to see a reduction in the price of lumber, indeed a continued increase in cost is not improbable. We must therefore look to our brick and concrete manufacturers for any relief in the cost of building material. In England, concrete construction is securing much attention. Messrs. Rowntree, at York, for instance, have built houses containing a large living room, a scullery and three bedrooms, at a cost of £90 each. In America, too, at Nanticoke and elsewhere, houses are being constructed at a very low cost and the rapidly developing use of concrete deserves special attention.

DETAIL OF COTTAGE FLAT, TORONTO.

Land.—The cost of land is such an important and increasing item of cost that no effort is too great to make more of it available for housing purposes. Rapid and cheap transportation is unquestionably the goal to be aimed at as the most hopeful means to this end. Much land at present used for farming purposes could be secured at a cost not exceeding $400 an acre. After making large provision for open spaces the cost of each building lot need not exceed $50. At present the cost of land in Toronto approximates $750 for each dwelling. This entails a very heavy charge upon the tenant. It is fair to assume that rentals would be lessened by from three to five dollars a month were cheap land made reasonably accessible.

Having once secured cheap land, the problem then becomes how to retain it at a reasonable price. Without going into a lengthy discussion, I desire to state my conviction that our system of taxation should be reformed and land should bear a considerably heavier tax rate than that placed upon improvements. Further, it is inconceivable that educated communities will forever allow values created almost exclusively by communal activity to be appropriated by land owners who may have done nothing whatever to create such values. I am not advocating the single tax, but surely some amendments to our present tax system are greatly needed, and I know of no other course by which, having once obtained cheap land, we may reasonably hope to retain it at a usable valuation for housing purposes.

It is also my conviction that brick or concrete dwellings of moderate size, of desirable type, and with satisfactory sanitary conveniences, costing not more than $1,250, should be entirely exempt from taxation until such time at least as we are provided with ample accommodation of this character to house our wage-earners. Some encouragement must be given if we are to secure an adequate supply. No one means will be found sufficient, but by all combined it may be reasonably hoped that we shall do something substantial toward meeting the existing great need.

Finance.—We now come to the question of cheap money and an ample supply of it. Believ-

---

*Paper read at the National Conference on Housing in America. The illustrations represent the work being done by the Toronto Housing Company in Toronto.

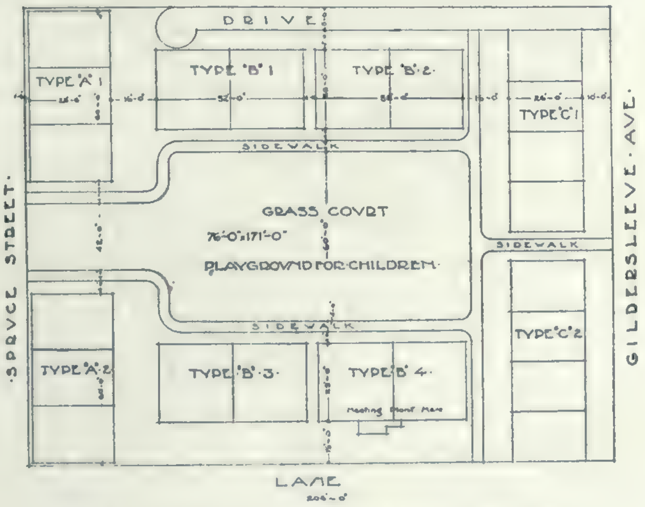
VIEW OF SPRUCE COURT, TORONTO.

ing the proper housing of our people to be a communal and not an individual responsibility, representatives of the Toronto Housing Company approached the Government of Ontario with a request for assistance. We claimed that private initiative had failed always and everywhere to provide an adequate supply of cheap houses for working people, and this being the case it was the duty of the Government, as representing all of the people, to assist in supplying such a vital need. The Minister with whom we had to deal is a man of large vision and great constructive ability—I refer to the Hon. W. J. Hanna. After careful consideration of the whole subject and with our co-operation, a Bill was framed through which the public spirited citizen of any municipality in Ontario may command the financial assistance required to supply necessary housing accommodation.

The Bill referred to provides:

1. That a company, the main purpose of which is the building of dwelling houses to be rented at moderate rents, may petition the town or city council to guarantee its securities, thus enabling it to raise the money to carry out such purposes.

2. If satisfied that such additional housing is urgently needed, and that the object of the company is not to make profit, but to be of bona-fide help in supplying such need, the council may, with the assent of the ratepayers, pass a by-law authorizing the giving of such guarantee.



PLAN OF COTTAGE FLATS, SPRUCE COURT, TORONTO.

3. The assent of the ratepayers is not necessary if the by-law is approved by the Provincial Board of Health.

4. The council must approve the location of the land, the general plans of the houses, and the form and terms of the securities to be guaranteed.

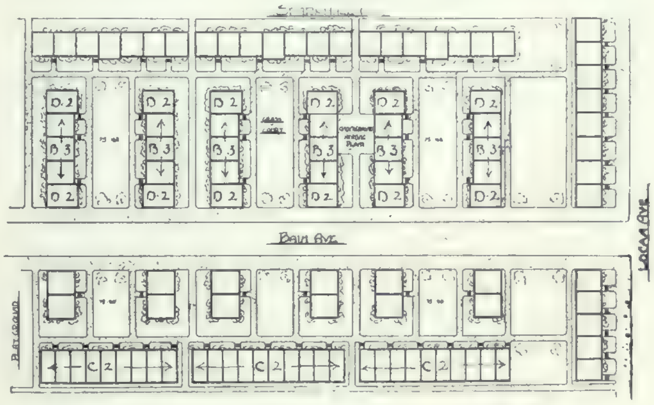
5. The total amount of securities guaranteed shall not exceed 85 per cent. of the total value of the lands and housing accommodation.

6. The council has the right to appoint one member of the board of directors of the housing company.

7. The books of the housing company shall at all times be open to inspection by the council.

8. No dividend upon the capital stock of the housing company shall be declared or paid in excess of 6 per cent. per annum. Such dividends shall be cumulative.

9. Any net profits received by the company in any year, and not required to pay the 6 per cent. dividend referred to, may be expended in acquiring the capital stock of the company.



PLAN OF COTTAGE FLATS, BAIN AVE., TORONTO.

10. After four years of operation the company shall, if requested by the city council guaranteeing its bonds, take steps by which the city itself shall acquire the stock of the company, paying therefor no greater premium than 10 per cent.

This Bill received the support of the leader of the Opposition, Mr. Rowell, and was afterward enacted by the unanimous vote of the Ontario Legislature.

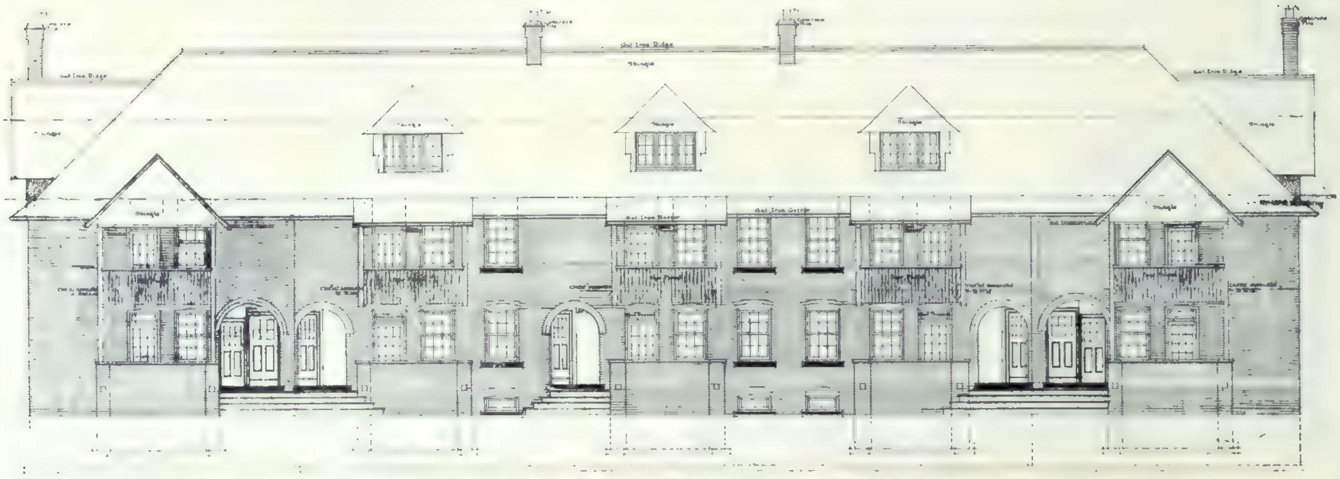
The principles underlying this Act which in our judgment seem wise are:

1. Where private initiative fails to provide an adequate supply of a pressing necessity the Government should and will lend its assistance to supply the need.

2. The principle of encouraging the voluntary co-operation of citizens with the Government in the solution of social problems.

3. The desirability of leaving the administration of such enterprise in the hands of those interested.

4. In undertakings, which by their nature,



FRONT ELEVATION OF TYPE D2 AND B3 ON BAIN AVENUE.

create a value which is the direct result of Government co-operation, such value (after providing for the repayment with interest of the private capital employed) shall belong to and be employed for the benefit of those co-operating. In the case of our housing company the cooperators outside of those supplying the capital are the city, through its guarantee of the bonds, and the occupants of our houses.

In framing this Act it was borne in mind that many persons though willing to assist pecuniarily in furthering the object of our housing company, were not able to do so; others though able, were indifferent or not willing. It was therefore necessary to devise a plan whereby all so disposed might be appealed to for assistance without too much pecuniary sacrifice being called for, and whereby also the municipality might take its proper share of the responsibility involved.

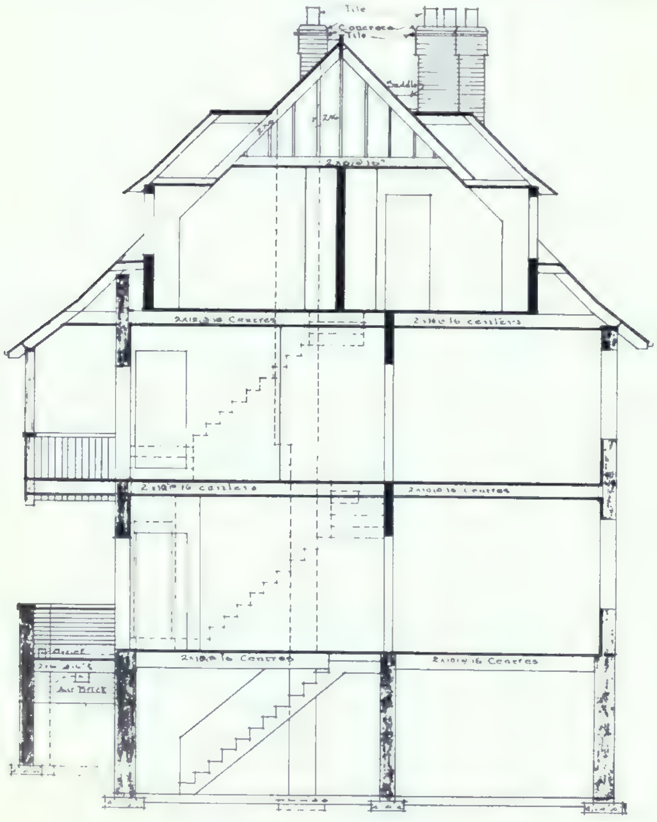
Under the power granted by this Act our company applied to the Toronto City Council for a guarantee of 40 year bonds to the value of $850,000. The matter was fully explained to the aldermen and the council guaranteed the full amount by a vote of 21 to 2. This $850,000 guaranteed by council together with the $150,000 provided by our shareholders forms the first $1,000,000 unit of our building operations. We have already sold $650,000 of these bonds which bear interest at 5 per cent.

A few days later we secured the approval of the Provincial Board of Health so that a vote of the ratepayers was not required and we were enabled to proceed with our plans without delay.

You will see by the above that we are conducting building operations upon a large scale. The reason is that we desire the overhead charges of management, offices, etc., to bear as lightly as possible in the form of rent upon our tenants. It will probably be found that the expenditure of further large sums will prove of equal advantage to the housing company and its tenants.

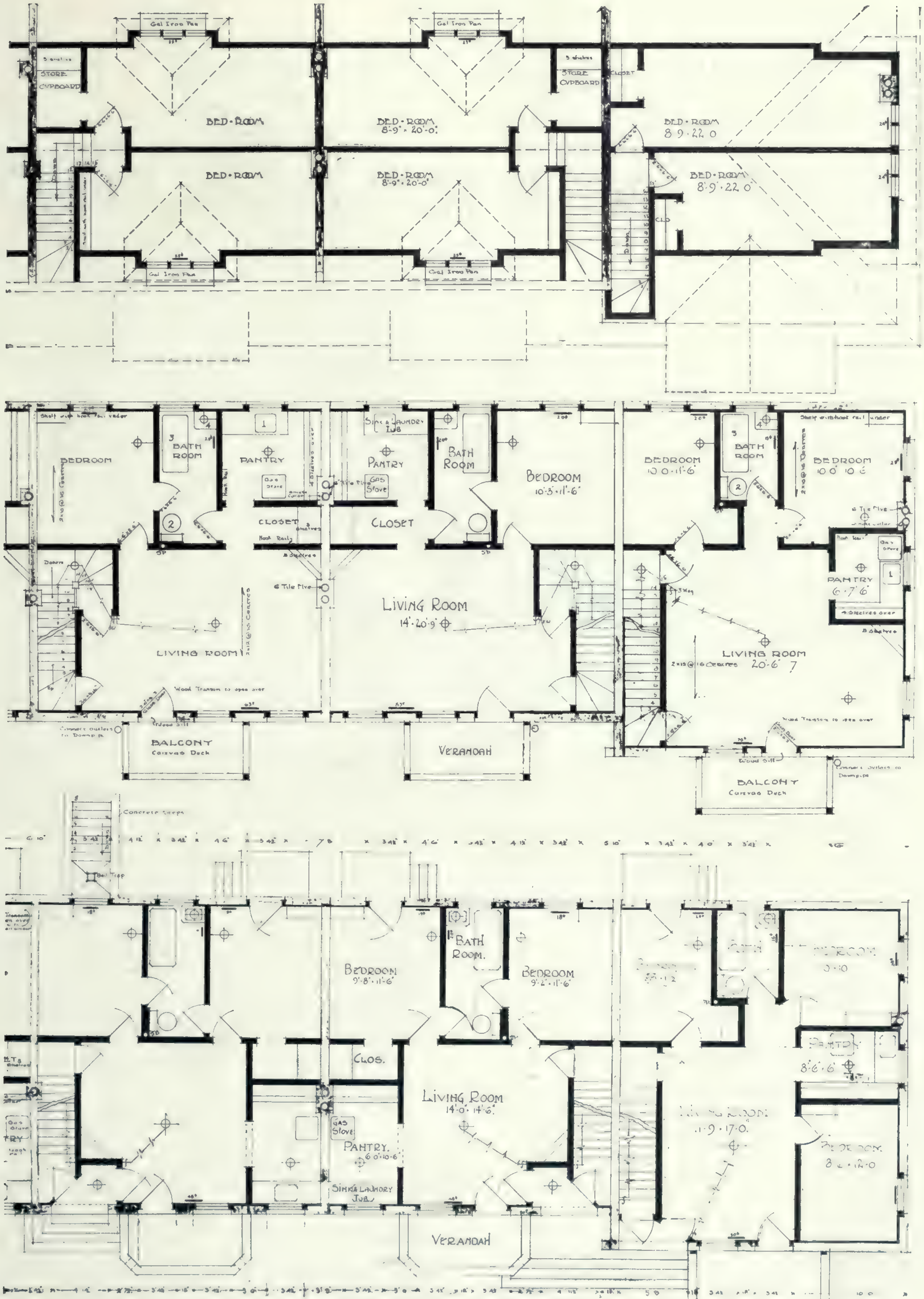
In a young country such as Canada, industrial development and trade expansion call for our entire financial resources. Without the cooperation of the municipalities which are suffering from overcrowding and similar evils, no really effective building development is possible. We do not destroy private initiative or public spirit, but supply these with machinery to make their good will effective.

The estimation in which the Act is held is well shown by the reference made to it by Mr. A. R. Clarke in his retiring address as Chairman of the Toronto Branch of the Canadian Manufacturers' Association. Mr. Clarke in part said:—"As a result of this Act, the Hanna Act as it is now called, a number of municipalities are now seeking to develop housing schemes in keeping with its provisions. In making provision for



SECTION · B · D

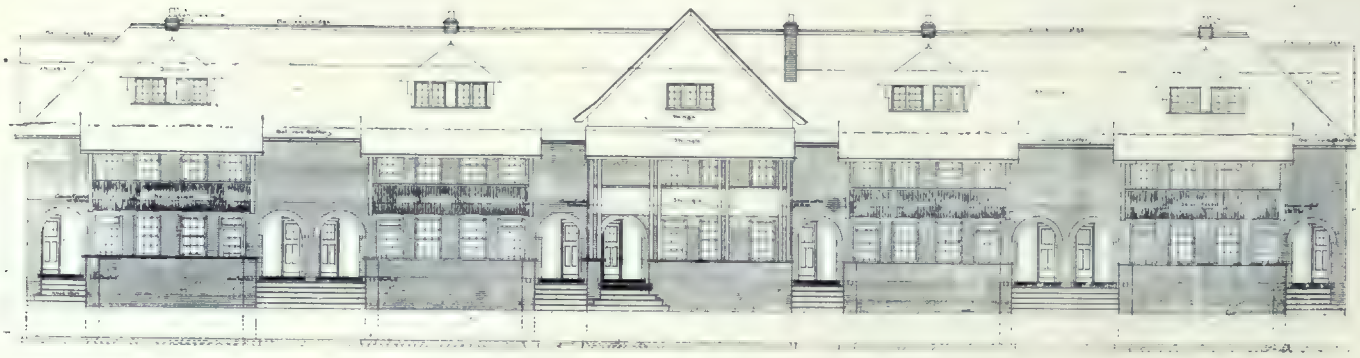
TYPE D2 AND B3 ON BAIN AVENUE.



GROUND, FIRST AND ATTIC FLOOR PLANS.

COTTAGE FLATS, TYPE D-2 AND B-3, ON BAIN AVENUE, TORONTO.

EDEN SMITH & SONS, ARCHITECTS.



FRONT ELEVATION OF TYPE C2 ON BAIN AVENUE.

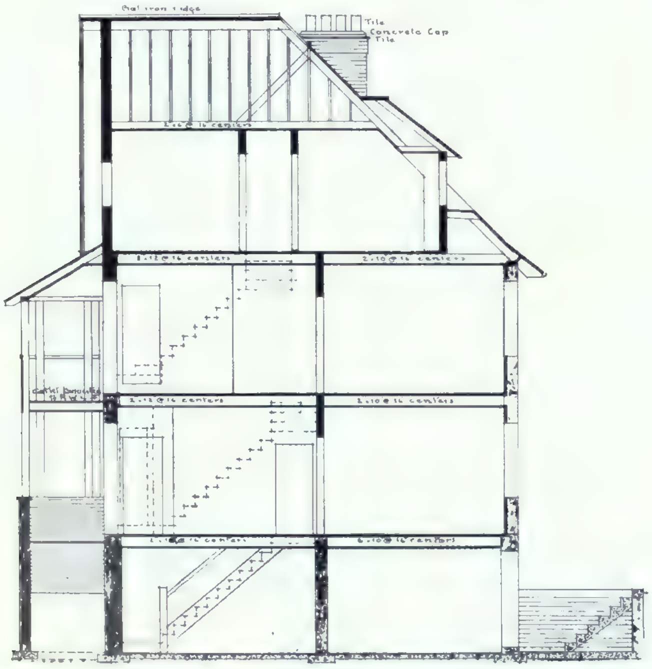
the health and comfort of that class of labor which industry so much requires, it will give a tremendous impetus to manufacturing in Ontario.

"This Act removes the financial barrier that has hitherto existed by providing the means for securing cheap money. Henceforth there should be no excuse in any city or town in this Province for the existence of unsanitary housing, and manufacturers, not only in Toronto, but throughout Ontario, should accept this as a challenge to themselves to see that the health and comfort of their employees is properly provided for."

As before stated the principles underlying the Act are: (1) Private initiative; (2) Government encouragement and guidance; (3) Public co-operation. I believe you will agree with me that this is legislation of a high order. It has already developed public spirit and inspired public service.

Other elements that enter into the final cost of buildings are:—

Durability.—In all construction it should be borne in mind that we are building for 40 or 50 years' occupancy. The ordinary jerry-built house deteriorates so rapidly that within 10 or 15 years it has lost its "respectability," and provides no longer a type of housing with which we would wish to be associated.



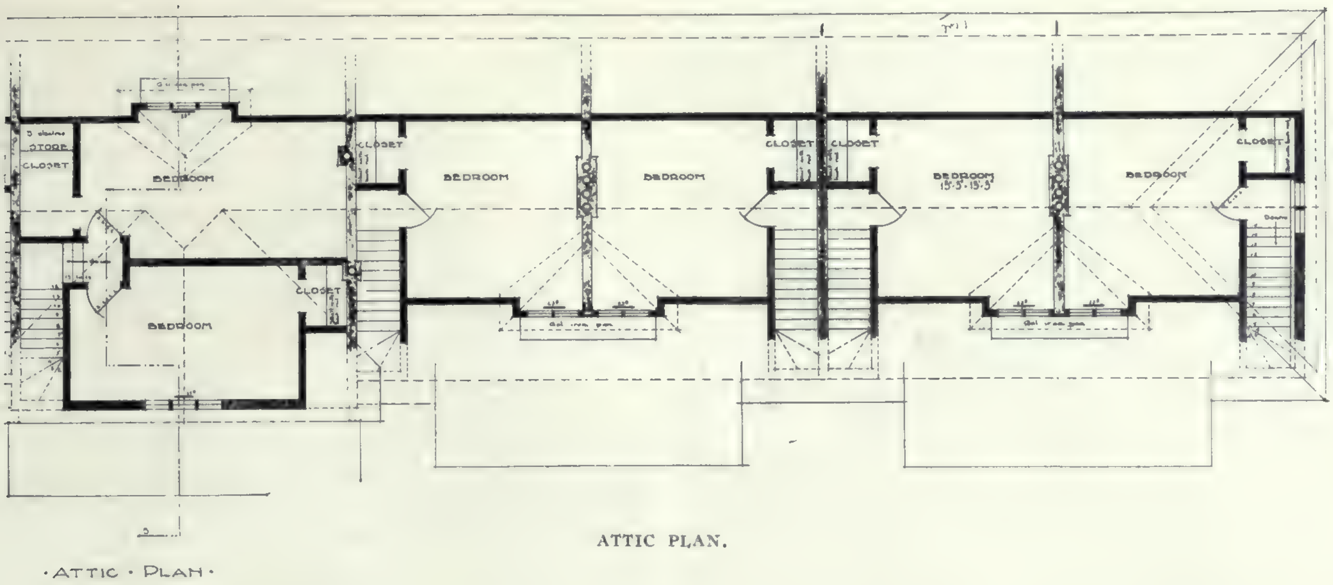
SECTION OF TYPE C2 ON BAIN AVENUE.

Attractiveness.—To build so that our houses will never lack tenants is to exercise true economy. During the coming years we hope to see a marked improvement in housing conditions. Let us build so that our houses will still be attractive after 20 years' occupancy and in keeping with the progress we hope to see realized within that period.

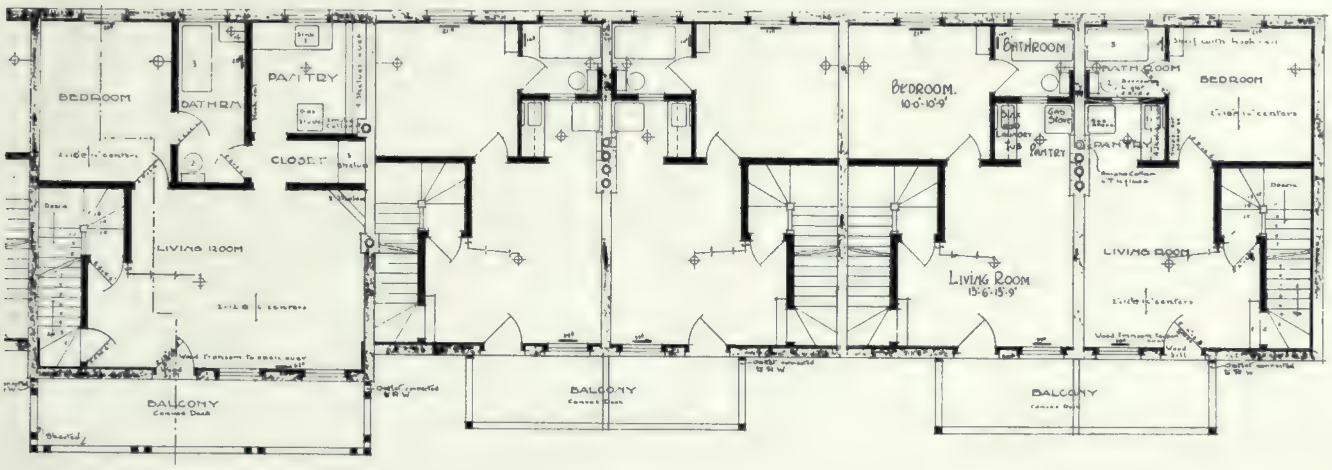
Town Planning.—We may reasonably hope for large economies from the general adoption of good town planning. The aesthetic values of such planning have been over emphasized while the economic gains, present and future, are not yet half appreciated. We earnestly wish for town planners the success their efforts merit. No new districts should be developed without their advice being had.

Industrial Suburbs.—To bring the factories of our large industrial enterprises into a proper relation with the homes of their employees is another method of reducing cost. Suburban industrial developments are to be most highly commended. Not only do they mean a saving in cost of land for all concerned but they mean more attractive houses for the workers, a saving of 50c. a week in car-fare, and, most valuable of all, an hour or possibly even two hours each day added to the time which may be spent at home. Gardening and other healthful recreations are made possible. All of this has money, social and moral value.

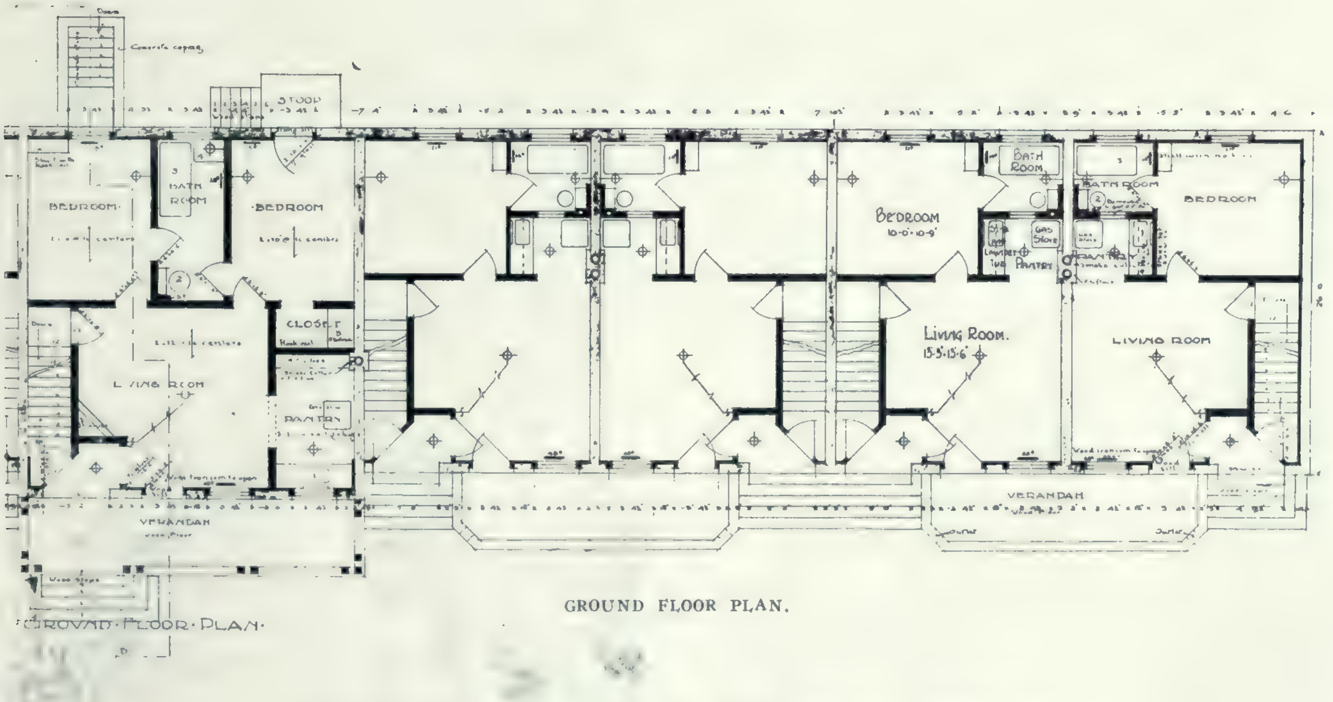
Housing By-Laws.—The restrictions of housing by-laws are adding materially to building costs to-day. A note of warning is not altogether unnecessary. If we, by regulation, increase unnecessarily the cost of new and desirable houses, by just so much do we increase the rental value of existing less desirable houses. A six-roomed house at $25.00 a month is a six-roomed house in Toronto whether the bedrooms contain in floor space 100 sq. feet or over as required by our existing laws or 80 feet as formerly allowed. I am not arguing for the latter—100 sq. feet is possibly a desirable mini-



ATTIC PLAN.



FIRST FLOOR PLAN.



GROUND FLOOR PLAN.

COTTAGE FLATS, TYPE C-2, ON BAIN AVENUE, TORONTO.

EDEN SMITH & SONS, ARCHITECTS.

mum for a sleeping chamber, but after all it depends primarily upon its fresh air and bright sunlight for living value and not upon floor space or cubic contents. All who have slept in small rooms well ventilated and large rooms poorly ventilated can speak with knowledge of their relative rest values.

ROOM IN COTTAGE FLATS, TORONTO.

So, too, with the proportion of vacant land to ground floor space. A house to most dwellers in the city is primarily a shelter and its livableness depends upon air and sunshine and sanitary conditions rather than upon the size of the yard. If the yard is ill-kept and surrounded by apartment houses it may contribute little of value to the dwelling. In our Toronto developments we have provided small yards only—simply a place to dry clothes, etc. The ends of the yards have been "moved" to the fronts of the houses and by a combination of these fragmentary yards we provide grass courts in front of the houses where the children find a real playground for their mutual enjoyment. As the living rooms of the houses, each with their little verandah, face this court, the mothers are able to keep an eye on the children without being called away from their housework. In developments of this type the Toronto Housing Company have four grass courts, three 80 x 160, and one 60 x 140.

In Toronto many of the lots are narrow and deep, the space between the rears of houses being over 160 feet. With a different planning many more desirable houses might be built, thus reducing the cost of land. In one case we bought over 300 feet frontage on each side of a city block. The lots are 125 feet deep and the rears adjoin without a lane between. We are building almost solidly upon the street frontage and reserving two inner grass courts each 90 x 100. One of these will be used in common by our tenants as a bowling green, the other as a safe playground for the small children, where they may play unmolested by motor cars. This will not reduce the cost of the houses, but it will be the means of giving more for the money, a result equally to be desired.

Superintendence.—Whether the cost of building will be lessened by employing a superintendent of works and competent foreman and laborers is a question upon which information is desired. That the houses would be better built is possible; I am not sure that the cost would be lessened. Up to the present our own development has been by contracting. As we are still in the initial stages of our building, we may be able to give comparative results at a later conference. Meanwhile, we are anxious to receive information derived from actual experience under both plans of operation.

Re Housing.—The activity of a municipality in acquiring run-down or unsanitary properties and building for those actually dispossessed is well illustrated by the work done at Liverpool. The chairman of the Liverpool Corporation Housing Committee says: "Liverpool realized that it was a question of poverty and that the best solution was to build for the identical people turned out at the spot where they were turned out and at rents which they could pay." Up to the end of 1912 the city has spent £1,135,000. The cost of this policy to the ratepayers is £22,700 per annum, £9,000 of this amount represents the sinking fund by which the property is paid for and which property will become a most valuable corporation estate in years to come. The death rate in the districts affected has fallen from 50 per thousand to 27 per thousand. Liverpool spends £80,000 a year on hospitals and £129,000 a year on cleaning, the sum of £22,000 a year does not appear to be too much to spend in saving human life. As showing the further value to the community as a whole it should also be added that offences of persons residing in the neighborhoods so improved, which in 1904 amounted to 202, fell in 1912 to 4. In the light of this great achievement we may well hold that "Man has no need to bemoan his neglect of impossible and remote

ROOM IN COTTAGE FLATS, TORONTO.

tasks, but only his failure to perform the near and possible."

The subject of how to get cheap houses is one that will confront us for many years. It is a permanent problem. If it will be thought desirable to make this a feature of future meetings, I would respectfully suggest that the question be sub-divided into sections, each to be dealt with in brief papers. In this way a valuable body of concise information based upon actual experience will be made available in a permanent form for all our members.

Some of the sections into which the subject would naturally fall are:

1. *Ground Plans.*—Maximum desirable use of land. Economical planning of sub-division. Relative saving in blocks of different housing units. Garden allotments, grass courts and squares. Garden suburbs.

2. *Indoor Plans.*—Large living room and small kitchen, vs. large kitchen and small parlor. Cost and desirability of basement. Size and location of bath, closet and laundry tub.

3. *Materials.*—Durability and up-keep of stucco. Concrete vs. bricks for basements. Tiles for partitions, walls, etc.

4. *Construction Details.*—Economic size in lumber. Standardization of doors and windows. Effect of joists left exposed without ceiling. Roofs: flat vs. gable; shingles vs. slate, tiles or asphalt board.

ROOM IN COTTAGE FLATS, TORONTO.

5. *Finishing Details.*—Paint vs. stain. Hard plaster vs. sand and lime plaster. Wall paper vs. kalsomine or other similar finish. Desirable forms of trim, door and window frames and stairways. Mantels.

6. *Fittings.*—Minimum larder, dresser and clothes closet equipment. Locks on all doors, vs. locks on outside doors with bolts and latches for other doors.

7. *Heating.*—Central heating plants, hot air, hot water, steam, kitchen ranges, fire-places.

8. *Ventilation, Refrigeration.*

9. *Management.* — Building by contract vs. purchasing material and engaging superintendent of works. Basis of rentals. Provision for up-keep whether by tenant or owner. Method of rent collection.

ROOM IN COTTAGE FLATS, TORONTO.

10. *Method of Finance.*—Co-partnership. Government co-operation. Municipal guarantee. Private shareholders. Plans for purchase by instalment. Plans and photographs of new buildings, showing ground arrangement, with actual costs where possible of masonry, carpentry, plumbing, heating, etc. Management of houses after occupancy.

Some of these details may appear to be unimportant, but unnecessary expense is doubtless incurred owing to lack of information upon them. No doubt too, some would be encouraged to build small houses if practical and ample information were easily obtainable.

In conclusion may I be permitted to add a few words upon the general subject of housing.

A clear view of our aim must precede any permanently valuable plan of operation. It is the reform of existing conditions we seek, a solution, not a palliation, of the housing problem. To build houses for those who need them is good, to make it possible for people to build and own their own houses is better. Let us not lose sight of the real object of our effort, whether we are engaged in securing legislative reforms, assisting in the enforcement of sanitary laws, or occupied in the construction of cheap houses.

The more we are compelled to seek cheapness in order to supply houses at a rental the tenants can afford, the more we should seek the cause lying hidden behind the existing need. The demand for cheapness below a certain level must mean that something is wrong with our social or industrial machinery. If we build down to a level which is not in itself desirable and productive of lasting advantage, we will not be using our energy wisely. To build below a level upon which our people should live may mean the establishing or perpetuating of a wrong social condition and doing little to supply a remedy. It is the remedy we seek. This at least is sure, that for every dollar spent in housing of a type not permanently desirable, two dollars should be spent by the city, State or Federal Government or by all combined, in seeking, finding and remedying the causes that render such lower level of living necessary.

Housing is a communal responsibility. Water, sewage and other public services are not more necessary to our citizens than are decent houses to live in. If individual initiative fails to supply these, it is the duty of the city or State to step in and supply the need. Our civic well-being, to say nothing of our national existence, is directly involved. I do not believe in building down to a level of which we should be ashamed as a people. Let us build on a plane which we hope may become the minimum at a near future. Let us leave to the charitable, to philanthropists and to social reformers the task of accelerating that future. If we do this we shall at least know that we have done nothing to postpone a greater degree of social justice and nothing to blind the State from a clearer view of its responsibility toward a large number of its citizens.

THE third National Conference on Housing in America was held in Cincinnati, December 3-5, 1913, under the auspices of the National Housing Association. The program presented many topics of interest to city dwellers, as the problem of cheap homes was taken up in all its various phases. The delegates were given a practical demonstration of the tenement house problem in respect to the ameliorating of conditions in such districts by visiting the densely populated portions of Cincinnati. During the inspection the work already accomplished in that city was pointed out in striking contrast to the former state of affairs.

REAR ELEVATION, SMALL COTTAGE FLATS.

During the conference George E. Hooker, civic secretary of the Chicago City Club, in an address on "Garden Cities," pointed out the advance which has been made in giving breathing spaces and parks to city dwellers. Light, air, land and a reasonable amount of the amenities of home life is being denied to thousands in cities, on account of crowded conditions, and this, he said, the garden city would prevent. This garden city movement, which began in England, and is rapidly spreading, has now become divided into garden cities proper, and also garden villages and suburbs. The advantages of numerous small parks and playgrounds in every community as a health and financial investment were told of in detail.

FRONT ELEVATION, SMALL COTTAGE FLATS.

Mr. Hooker, in speaking of garden cities, said: "It surely cannot be necessary to enforce upon any person who goes about modern cities with eyes, ears and nostrils open, the progressive deterioration and destructive influence of many features of urban life. The harsh noises from the wheels, hoofs, brakes, and signals of the geometrically increasing amount of communication in great cities, as it has been allowed to develop, are ever beating more and more loudly upon the ears of the active members of the population. There is not a street in the central part of Chicago, or any other great city of the western world, where one can walk without one's nostrils being filled with the dust and gas of automobile traffic. The eye of the passer-by along the common city street is assailed with a panorama of architectural anarchy, disordered sky-lines, littered lots for sale, and general ugliness, which demoralizes people, save as it provokes them to revolt, and which is so prevalent and persistent that it largely tires out and defeats revolt.

"These conditions are steadily overcoming and defeating the sense of the sacredness of human life, even as against violent and dramatic forms of death. In Chicago, 1,195 deaths from accidents occurred in 1911, an increase of 26 per cent. in five years, or twice the increase in population. This increase is probably largely because well-to-do people, in seeking to get away from these conditions by their automobiles, ride down the common people, who cannot of themselves get away from them. We cannot blame those who can do so from trying to get away from them, but just to flee is not to deal with the situation.

"Europeans have taken steps to learn the facts in the case far more than we have. It is known that 70,000 people in Dublin are living in tenements of a single room, that of the nearly one million of British mothers, annually, 95,000 lose their babies within a year of birth; that, as a rule, only 1,000 out of 7,000 youths offering themselves for the British Navy are, on examination, found fit; that only 38 per cent. of the young men in Berlin are fit for military service. Germany, indeed, in her military policy, is adopting systematic gymnastic training in the schools in an effort to counteract the physical deterioration caused by city life."

Another division of the conference listened to an address by Arthur C. Comey, of Boston, on "Co-operative Housing." He said the problem of housing is three-fold, architectural, social and financial. He continued that the only proper way to do away with the old system of landlords, so-called, was to apply a limited dividend system, speculative profits being eliminated and the money returns fixed, commensurate with the risk involved and at a fair percentage to the builder. Wholesale co-operation is likewise a fundamental principle, according to Mr. Comey, in erecting proper housing at a minimum and reasonable cost to the resident. Another principle involved is the participation and interest in the work by the resident of the building. This paper was discussed by W. S. B. Armstrong, of the Toronto Housing Company; C. S. Bird, of Massachusetts, and P. R. McNeille, architect, New York City.

The relation of what is known as the "housing problem" to the taxation of improvements was made clear in an address on "How to Improve Housing Conditions," by John J. Murphy, Tenement House Commissioner of the City of New York. Mr. Murphy told of the splendid work done by the commission of which he was a member to improve sanitary conditions, and reminded his hearers that under the law the fashionable apartment house was just as much a tenement house as the crowded houses where the poor find shelter. He stated, in fact, that the careful father of a family nowadays would not think of allowing his children to dwell in some of the domiciles which were deemed desirable apartment houses a few years ago, but which were wholly unsanitary. But dealing with what we ordinarily understand as the tenement house, he said:

Tenement house construction can only be carried on as a commercial enterprise, and it must be made to pay. And, broadly speaking, it does not pay to provide homes for the very poor. In order to be near their work, they live on dear land, and where land is dear no devices of construction and no economy of space can put rents very low. The old story of the dog who learned to wag his tail up and down instead of sideways because his owners lived in a flat humorously symbolizes a sad situation. The narrowness of the lives of the poor, has a double significance in New York. Philanthropy has only touched the hem of the problem. However generous, it is powerless to materially alleviate an evil whose roots draw their sustenance from economic forces. These forces which might be made the engines of economic uplift, when improperly applied, steadily press downward on the submerged tenth, and tend to make the fraction larger. If we would solve the problem before us, we must study them to see if they cannot be made to work regeneration.

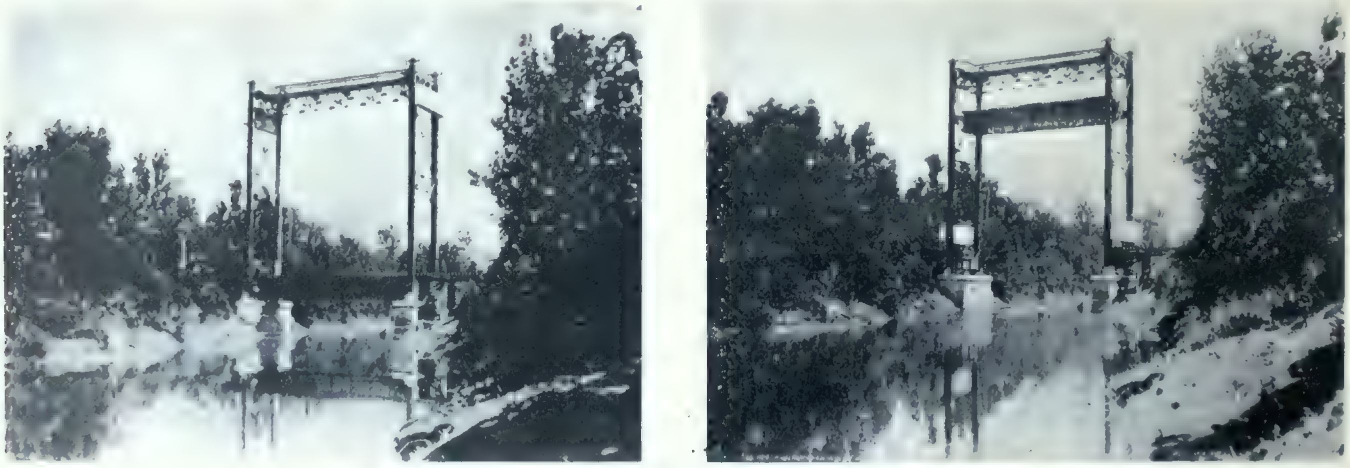
Treating of solutions, Mr. Murphy said there were three. Dealing first with municipal housing as adopted in some European cities, he declared that nowhere had operations been conducted on a large enough scale to do more than skim the surface of the depths. Taking up cheap transportation—which at first sight seemed a hopeful *solution,* he declared that the advance in site valuations consequent thereon, defeated the expectations of those who advocated it. The only real solution, in his opinion, was the abolition of taxation on improvements, and he came to Canada for his examples. These were his words:

Improved methods of taxation may yet solve the problem which has defied so many solutions. The unprofitableness of tenements now often proceeds from the short-sighted policy which taxes heavily improvements while leaving mere speculation to escape with a minimum burden. The tax bills of tenement houses and small private houses are often enough to discourage would-be owners. We fine men for their industry, and reward others for their sloth. Where we need so many homes, we should do everything to encourage their production, whereas we penalize them heavily. I hope to live to see the day when no man who puts his money into the production of goods or houses will be taxed because he does so.

A number of Canadian cities, especially Vancouver, are now trying the experiment—so far with conspicuous success—of exempting improvements entirely. While this may seem fantastic, I can see no other way by which the "Housing of the Poor" can be lifted from the dismal swamp in which it is now submerged. No one can appreciate more keenly than I, that the way of this plan is beset by many difficulties. In New York we have capitalized congestion and built the city's credit on this insecure foundation, but I have faith that the way out of the mire will be found.

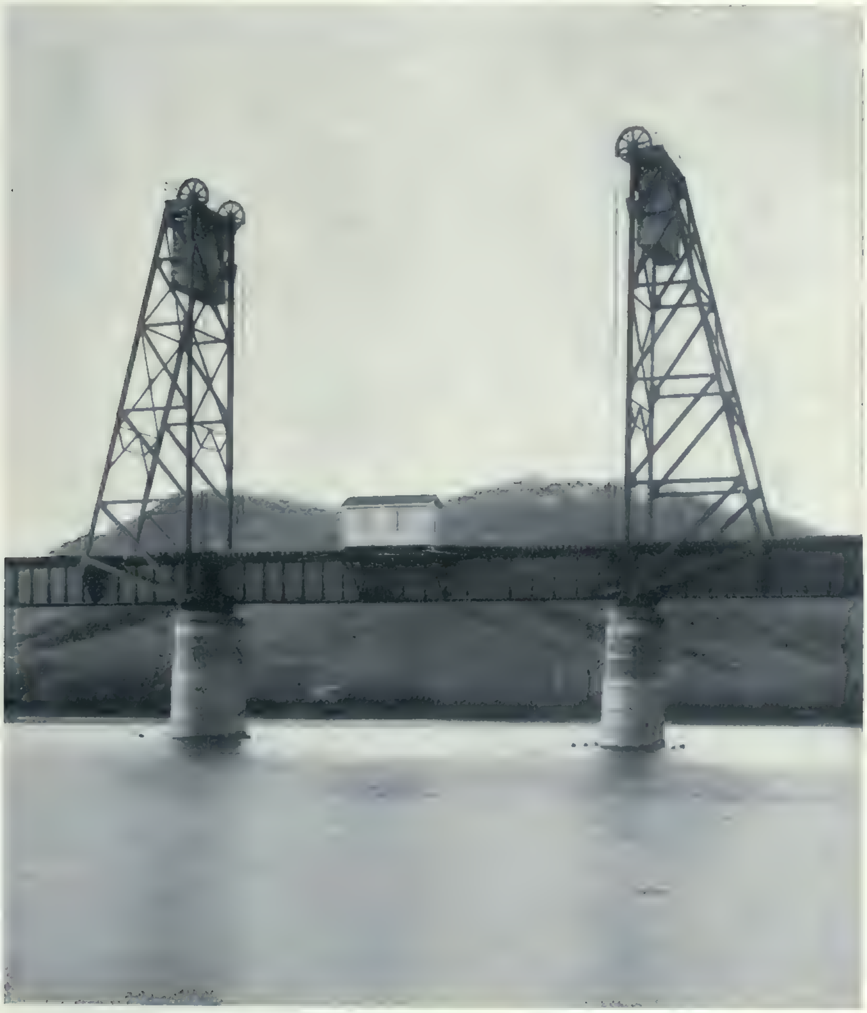
Lift Bridge at Kamloops, B. C.

THE Canadian Northern Railway has recently completed a girder type lift bridge across the North Thompson River at Kamloops, B.C., 1,209 feet long with additional approaches of 1,123 feet. It is the first bridge in the Dominion having a vertical lift span, 93 feet long, and can be raised 57 feet above high water level. The lift span, consisting of a 93-foot deck plate girder, weighing about 236,000 pounds, is balanced by counter weights attached to cables which pass over sheaves at the top of the towers. There are four (4) one and one-quarter inch cables at each corner of the span, while on the span side equalizers are used to distribute properly the load to each rope. The span is guided along the sides of the front tower columns during its movement, the guides being detailed so as to allow proper movement at the expansion end under temperature and live load changes. The counter weights are likewise guided along the sides of the towers. Centering castings are used at the ends of the span to bring it in proper alignment when seated, which castings take the thrusts from the trains. Special rail castings are used at the ends of the lift span to give continuity to the rails at these points when the bridge is down, and at the same time locks are provided for each end of the bridge. The span is raised and lowered by means of cables fastened at the top and bottom of the towers. These cables, which pass over drums at each corner of the span, are actuated by a system of gears and shafts connecting to a gasoline engine at the centre. All machinery is below the deck except the operating levers and indicator, which are located in the operator's house, supported at the level of the deck from the side of one girder. A limit switch is used in the igniter circuit to cut off the engine after the span has passed a certain point in both its up and down movements. Contacts are likewise placed on the clutch lever so as to control the igniter circuit in conjunction with the limit switch, while a hand brake is installed for manual control of the engine. The greater part of the machinery is enclosed between the girders just below the deck at the centre of the span, and is accessible from the operator's house by means of a stair and



SPAN IN PLACE. BRIDGE AT BIG CHOCTAW BAYOU, LOUISIANA. SPAN RAISED.

door through one of the girders. The work is designed to lift the span 53 feet in 100 seconds, providing a clearance of 55 feet above high water. The Kamloops bridge is as yet the first of its type in Canada, while the St. John and Quebec Railway are contemplating the erection of a similar one across the Oromocto River near Fredericton South, N.B. There are only two other bridges of this nature as yet in operation, one over Pond Oreille at Sand Point, Idaho, and the other over the Big Choctaw Bayou in Louisiana, views of the latter being shown herewith, one with span raised and the other in place. This structure has a 50-foot lift span of the through plate girder type, which is fully balanced by concrete counter weights and operated by hand. The span is raised to the full height of 47 feet above high water, or lowered, in ten minutes. The piers are of concrete on pile foundations, similar to the one at Kamloops. It is claimed for the vertical lift bridge that it is a simple span in which all stresses are determinate, like those of a fixed span, economically adapted to a skew crossing, to construction on a grade and to a future change of elevation of grade. Furthermore, it is as rigid as a fixed span and may be paved in a like manner. Since the floor is always horizontal, spans of any lengths may be built, and the longer the span the greater the comparative economy of the vertical lift bridge. The wind has little effect upon either towers or span, for they expose small areas to it. The span is fully counterweighted, so that the operating machinery has only to overcome the friction and inertia, necessitating but one operator, no matter how large the open channel. The Kamloops bridge, erected under the able supervision of H. L. Johnston, Divisional Engineer for the Canadian Northern Railway, crosses from the Indian reserve on the east bank to the British Columbia Fruitlands property on the west, having fourteen concrete piers. The approximate cost of the bridge was $250,000 and was designed by Waddell & Harrington, Consulting Engineers.



DETAIL OF VERTICLE LIFT AT KAMLOOPS.

During the construction of the St. Lawrence Bridge by the C.P.R. four 408-foot spans were erected by launching each span endwise with its rear end supported upon an ingenious truck or buggy, while the forward end was supported on a large scow. This scow consisted of two independent scows with two 100-foot deck plate girder spans placed so as to equalize the load. Anchors composed of concrete blocks each weighing seventy-six tons, were placed 1,500 feet upstream in addition to an "I" beam embedded in the rock. In launching, the span was started by a number of jacks, after which an engine, located where a direct pull could be made from its drum, controlled the whole movement. The four 408-foot spans were alike in weight and general characteristics, but two methods differing somewhat in detail were used in placing them. The two downstream spans were launched on the same set of carrying scows, but with a pilot scow upstream to take up the slack in the cables. The experience gained through launching the two downstream 408-foot spans led to the abandonment of the pilot scow for the placing of the upstream spans. Under this arrangement the new spans were allowed, while travelling, to rub along a specially prepared vertical skidway bolted to the lower chords of the downstream spans already in place. During the work all trains passed over the adjoining spans, which made the average elapsed time for each girder over two hours, while the net moving time was thirty minutes.

CONSTRUCTION

A · JOURNAL · FOR · THE · ARCHITECTURAL
ENGINEERING · AND · CONTRACTING
INTERESTS · OF · CANADA

FREDERICK REED, Editor

H. GAGNIER, LIMITED, PUBLISHERS
Corner Richmond and Sheppard Streets,
Toronto - - Canada

BRANCH OFFICES:
MONTREAL—171 St. James Street
WINNIPEG, MAN.—13 Royal Bank Building
CHICAGO—People's Gas Building
NEW YORK—156 5th Avenue

CORRESPONDENCE.—All correspondence should be addressed to "CONSTRUCTION," Corner Richmond and Sheppard Streets, Toronto, Canada.

SUBSCRIPTIONS—Canada and Great Britain, $3.00 per annum. United States, the Continent and all Postal Union countries, $4.00 per anum, in advance. Single copies, 35c.

ADVERTISEMENTS—Changes of, or new advertisements must reach the Head Office not later than the twentieth of the month preceding publication, to ensure insertion. Mailing date is on the tenth of each month. Advertising rates on application.

CONTRIBUTIONS—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and duly returned.

Entered as Second Class Matter in the Post Office at Toronto, Canada.

Vol. VII Toronto, March, 1914 No. 3

CURRENT TOPICS

MESSRS. LANGLEY & HOWLAND, architects, have moved to their new offices in the North American Life Building, 112-118 King Street West, Toronto.

* * *

J. H. HAFFA has opened an office for the practice of architecture in the Peterkin Building, Bay Street, Toronto. Catalogues, samples and manufacturers' prices solicited.

* * *

THE ARCHITECTURAL firm of Burke, Horwood & White announce the removal of their offices from 28 Toronto Street to the Ryrie Office Building, corner of Yonge and Shuter Streets.

* * *

THOMAS H. MAWSON has been selected on the personal recommendation of the King and Queen of Greece to prepare a comprehensive plan for remodelling and beautifying Athens. Mr. Mawson in a recent interview speaks of his new work in the following manner:

"One of the most immediate necessities of the city is to provide a site for the new Union Railway Station, which will form a worthy portal to modern Athens. This great scheme is necessitated largely by the fact that within fifteen months there will be direct communication with Paris.

"The next work, which will be carried out in harmony with the views of the British, German, and American Schools of Archæology, will be the clearing away of the accretions of the hovel shanties which have grown up around the Acropolis and the ancient ruins of Athens. Some of these hovels date back almost to the time of the Turkish occupation.

"Great extensions will have to be planned in the ancient city and a great royal processional road will also be constructed between Athens and Piraeus. Sites must be found for new Government buildings, such as the Law Courts. A great water scheme is on foot for Athens, by which water will be brought to the city. In four years the provision of the new water supply will afford the opportunity for placing many fountains and the formation of ornamental waterways and lagoons—all of which will add to the city's beauty.

"One point on which their Majesties are more anxious than any other is the creation of a great public park and gardens and a boulevard system. Any one who knows Athens will realize that this is a prime necessity. Already the King and Queen have done a considerable amount of planting. Some of the hills surrounding the city are completely covered with new growths of native pines and cypresses. The work will be extended in all directions. Experimental gardens will be laid out, in which will be tested all the native trees and shrubs."

The completed scheme will include several areas devoted to housing the working classes. Mr. Mawson won the competition for the design of the gardens surrounding the Carnegie Peace Palace at The Hague. He has also been engaged to replan Vancouver, Calgary, Regina, and Banff.

* * *

THE FOLLOWING method for mixing the top layer of concrete floors has been successfully handled in various parts of America: Iron dust to the extent of 15 lbs. to 30 lbs. is mixed with 100 lbs. of the cement dry, and one part of this mixture to two parts of sand makes the slush for the top coat, which varies from one-half inch to one inch in thickness. It makes a hard and durable floor, thoroughly waterproof, and not slippery. The hardening material is also used to make new concrete adhere to old concrete in repair work.

AT THE FIFTH annual meeting of the Commission of Conservation, held in Ottawa recently, Col. J. M. Burland presented the report of the Advisory Committee on Town Planning, which for some months past has been pursuing investigations with a view to formulating some comprehensive scheme applicable to all the Provinces of Canada. A draft bill was submitted embodying the main features which, in the opinion of the committee, every Provincial Town Planning Act ought to possess. In broad outlines, the draft bill may be said to contain two principal proposals: (1) the creation in each Province of a Department of Municipal Affairs, with a branch specially devoted to town planning; (2) the creation of local town planning boards in each municipality to co-operate with the central authority. It is intended that the Provincial authorities' approval shall be necessary to the legality of all debentures issued to finance town planning schemes, and that they shall possess power to expropriate private property required in the department of a town plan. A part, at least, of any scheme shall be charged back on the property benefited.

* * *

EX-ALDERMAN James H. Garden, president of the Alberta Town Planning and Housing Commission, is making preliminary arrangements for holding a Provincial convention of the Town Planning Commission in Calgary this year. The mayors of all the cities and towns in the Province are being communicated with and requested to lend their co-operation and send delegates to the proposed convention. It is pointed out that the reason for holding the convention here is that Calgary is the logical centre, and has fostered the town planning idea from the start. The housing question is one of the principal subjects which it is proposed to deal with at the convention, if it can be arranged, as those behind the movement realize that cheaper housing must be provided if Calgary is to become a manufacturing centre.

* * *

FEELING that the unrest in Ireland is due to her isolation and that her real salvation lies in a renewed commercial activity, H. E. Tyrrell, C.E., proposes a scheme for uniting the island to England by means of a railway across the Irish Channel. In speaking of the venture, he says: "The most promising of all methods for crossing this deep and navigable channel is by means of a floating tube, either on the surface or submerged. It would consist of a metal shell lined with concrete to give it strength and weight. As the metal would become corroded with rust and finally eaten through, the concrete would still remain, greatly hardened with age. For a tube floating on the surface I would leave openings of 1,000 feet, four to five miles apart, for the passage of ships, the position of the openings being indicated by signals. Beneath these openings the tube would be depressed, leaving 40 to 45 feet of water above it for the passage of the largest ships afloat, which at present does not exceed 36 feet. This would provide for increased draught, as has been done on the Panama Canal. The depressed portions would be connected by easy grades with the surface sections, which must be strong enough to resist all surface disturbances, and to bridge the waves from one crest to another. A tube submerged throughout its entire length, is, however, preferable to one on the surface, for the channel is then all clear for navigation. The tube sections would be built on shore in convenient lengths of 200 to 400 feet, with closed ends, and then towed out into position and sunk. The temporary end dams would be 4 to 5 feet back from the ends, leaving space for the divers when bolting the sections togther. The cost of such a double track tube would be $25,000,000 to $30,000,000."

* * *

"IT IS UNUSUAL for a house, however small, to be erected in France without the services of an architect, who not only draws the plans, but actually superintends the work. Usually it is he who orders the building material and assures himself that its quality is up to specifications and requirements. The contractor and his workmen perform their duties in conformity with the architect's orders, and the latter, who is usually a man of capital, advances the funds required in order that the contractor need not wait for payment until the building is completed. Moreover, the French law imposes on the architect a serious responsibility, since he, as well as the contractor, is responsible for all defects of construction during a period of ten years."

* * *

THE PROVINCIAL Architects Association of Saskatchewan now desire powers similar to those granted by the Legislature to the legal and medical professions, and application to this end will be made at next session. The Association particularly desires to be able to deal with such cases as that which recently came before the courts, in which a man was charged with collecting fees for architectural work although not registered as a member of the profession.

* * *

THE NATIONAL Association of Builders Exchanges at their annual convention held in Winnipeg during the latter part of February, selected Saskatoon as their next meeting place.

Matters discussed at the convention were of a more or less internal character. Resolutions were adopted favoring stricter enforcement of the Mechanics' Lien Act and Workmen's Compensation Act, the establishment of technical schools by the Provincial Departments of Education in the West and urging the Dominion Government to take into its own hands the control of employment agencies. The resolution is as follows:

"We regret to say that none of the Western Provincial Houses of Parliament have manifested any sincerity in carrying out the several amendments to the Mechanics' Lien and Workmen's Compensation Acts, as asked for by the individual Exchanges, as well as the Provincial bodies during the last year.

"While we do not hold out much or any hope that these questions will be taken hold of and dealt with in an impartial and fair spirit, we would nevertheless urge upon the Provincial Exchanges to keep importuning their respective Governments to amend these Acts as have been asked for many years without avail.

"Whereas, the need for technical education is urgent for the better equipment of young men and women of our Provinces, and whereas, these schools have been established as part of the educational system in many countries of the world, be it therefore resolved that we urge upon our Provincial Governments the establishment of technical schools throughout the country at the earliest possible date.

"Whereas, the employment agencies throughout the country are conducted by private individuals, almost wholly without any authoritative control, and whereas in many cases unscrupulous contractors of labor have taken advantage of the ignorance and helplessness of unsuspecting seekers of employment, thereby entailing much financial loss and deception of this class of people, and whereas, we believe that this condition of affairs should not exist, but should be under Federal control, be it resolved . . . that we petition the Dominion Government to take over complete control of the labor bureau question by placing them under the guidance of a Federal officer, or officers, to be operated free of charge to seekers of employment throughout the Dominion, so as to eliminate loss of time and money, and make for more efficient handling of the labor question."

Officers for the year were chosen as follows: Honorary President, W. J. Davidson, Winnipeg; President, C. R. Frost, Edmonton; First Vice-President, J. P. O'Leary, Saskatoon; Second Vice-President, Jos. Bourgeault, Winnipeg; Honorary Secretary-Treasurer, A. M. Frith, Edmonton. Mr. Frith will select a Secretary-Treasurer to assist him with the work of the association.

BURNS LYMAN SMITH, owner of the L. C. Smith Building in Seattle, Washington, Gaggin & Smith, architects, the tallest building in the world outside of New York City, said recently while discussing the planning of this great structure: "Byers' genuine wrought iron pipe was specified throughout. Every influence within reason was brought to bear upon the architects and myself to change to steel, but the more I looked into the merits of wrought iron versus steel, the more convinced I became that Byers' pipe was by far the best." The guarantee of quality offered by the A. M. Byers Company is based on the absolute control of all the steps in the manufacture of its pipe, from the time the ore is taken from the ground to the final delivery of the finished pipe to the purchaser.

* * *

DARTNELL, LIMITED, beg to announce that Mr. W. H. Evans, C.E., has joined their sales staff. Mr. Evans comes direct from Toch Bros., New York City, where he has had a number of years' experience in selling technical paints and waterproofing materials. Besides having a thorough knowledge of technical paints, Mr. Evans is a practical waterproofing engineer and the Dartnell people look for a great increase in their R.I.W. and Toxement business.

* * *

THE TALLMAN Brass & Metal Company of Hamilton are forced through advance orders to build a 50 by 220 foot addition to their factory for the manufacture of electric fixtures.

* * *

THE SUN BRICK Company furnished two million brick for the construction by the Toronto Housing Company of working men's homes illustrated in this issue.

* * *

THE LAST WORD

in the art of manufacturing High Grade Surveying and Drawing Instruments has been developed in the Dietzgen Instruments, the possession and use of which guarantees accurate results.

Scales, Slide Rules, Draughting Equipment and Accessories of a complete list are also manufactured by us and sold direct to the Architect and Engineer.

BLUE PRINTS
made from tracings a specialty.

EUGENE DIETZGEN CO., LTD.,
116 Adelaide St. W., Toronto.

CONSTRUCTION

April, 1914 Vol. 7., No. 4

CONTENTS

EDITORIAL 123

Canada's great fire loss compared to that of Europe——Value of tapestries brought into America during recent years.

WATERLOO, ONTARIO 127

STORE AND LOFT BUILDINGS 137

T. J. Foy Company——Wolseley Motor Car Company——Crown Tailoring Company——Temple-Pattison Building——Hermant Building——Chapman & Walker Building——Cooper Cap Company.

THE ARCHITECTURE OF MEXICO 144

BRIDGE SUBSTRUCTURE 153

ENGINEERING BOOKS 160

CURRENT TOPICS 161

Full Page Illustrations

MUTUAL LIFE ASSURANCE CO. OF CANADA—Main Facade ..... Frontispiece

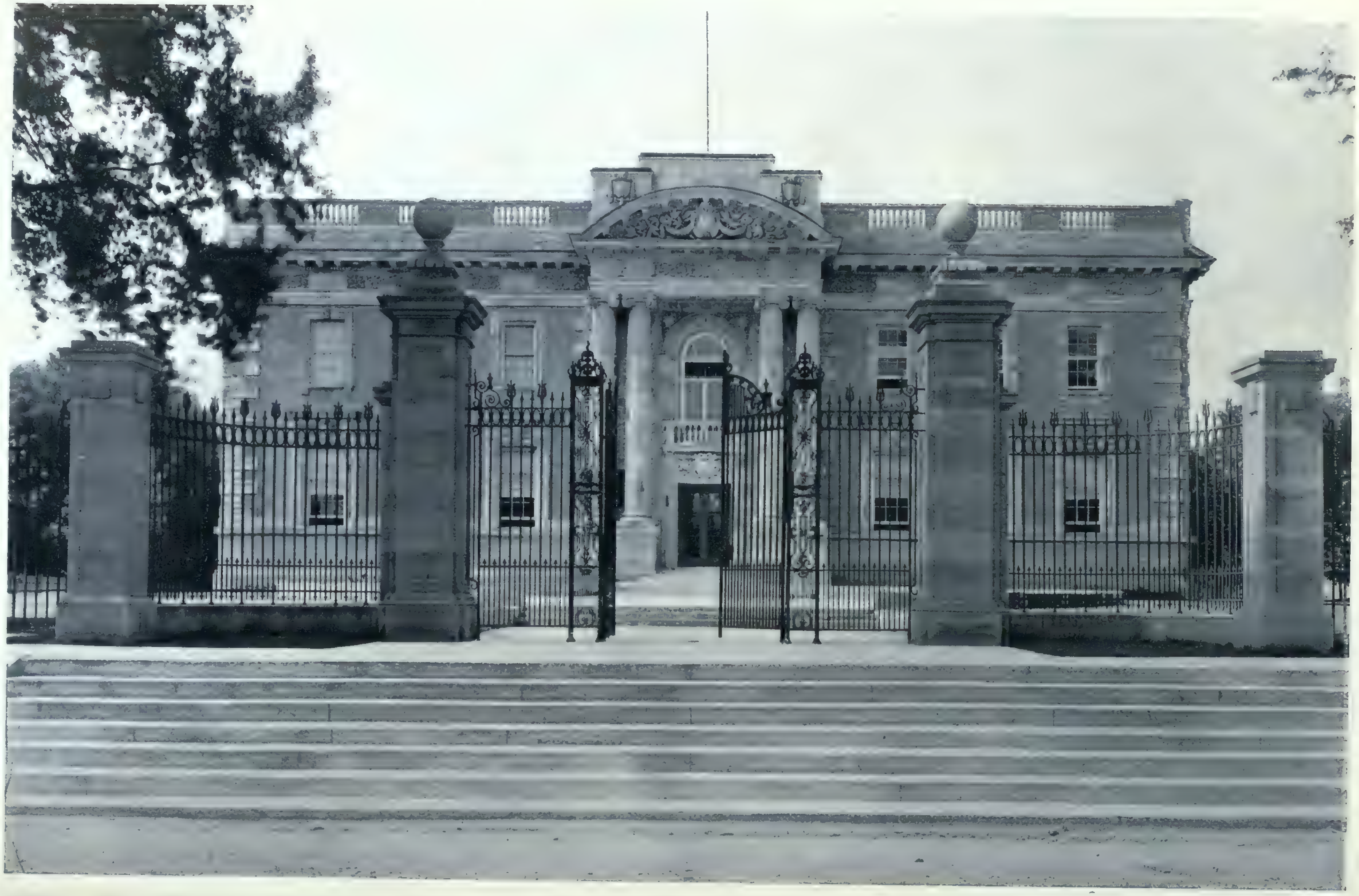
MUTUAL LIFE ASSURANCE CO. OF CANADA—Board Room 125

MUTUAL LIFE ASSURANCE CO. OF CANADA—Main Office 128

ORDER PROBLEM OF DESIGN, UNIVERSITY OF MANITOBA 163

H. GAGNIER, Limited, Publishers
GRAPHIC ARTS BLDG., TORONTO, CANADA

BRANCH OFFICES:
MONTREAL WINNIPEG CHICAGO NEW YORK



MUTUAL LIFE ASSURANCE COMPANY
OF CANADA, WATERLOO, ONT.

DARLING & PEARSON, ARCHITECTS.

EDITORIAL

The great loss by fire—Reasons why it is so much greater in Canada than in Europe, and methods for remedying same—Better fire escapes needed.

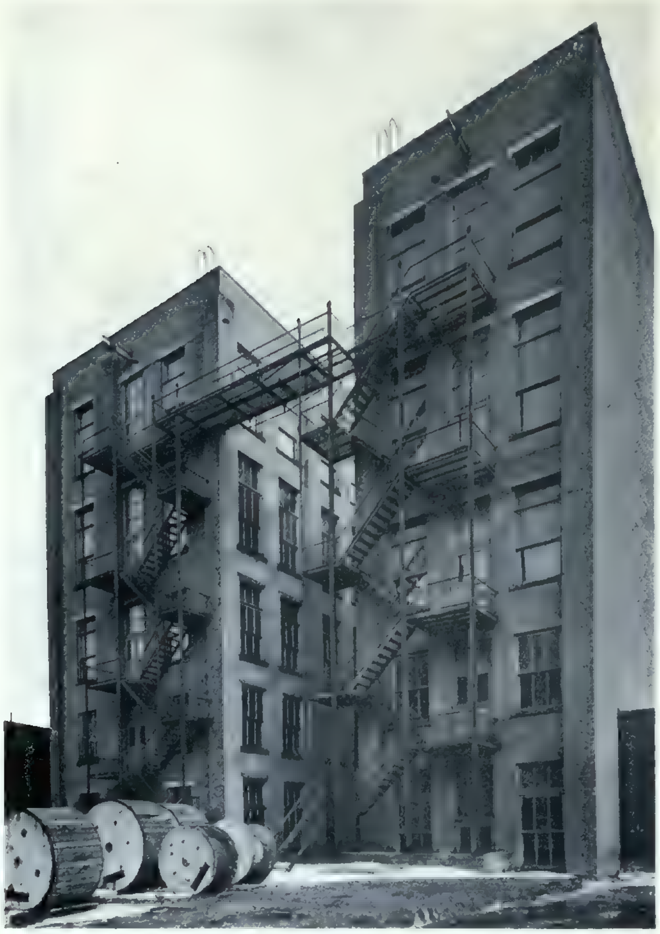
THROUGH IGNORANCE partially and recklessness mostly, Canada and the States lost $196,029,500 by fire during the year 1913. The number of conflagrations during the first three months of the present year promise a total for 1914 far in excess to the one just quoted. In Canada alone the loss per capita for the last three years has been $2.90. An appreciation of what this means may be realized from the fact that for each person, man, woman and child, the assessment amounts to $5.63 if we include the interest upon debentures, and maintenance of fire departments.

In order to find the causes leading to preventable fires, the New York Fire Department compiled the following statistics: Number of fires from matches, 1,629; carelessness with cigars, cigarettes, etc., 1,273; carelessness in the use of illuminating gas, gas lights, ranges, radiators, etc., 849; bonfires, brush fires, igniting fences, etc., 849; heat from stoves, stovepipes, furnaces, steam-pipes, 844; chimney fires and sparks from chimneys, 784; children playing with matches or with fire, 657; carelessness with candles, tapers, etc., 500; electric lights, wires, defective insulation, 424; total, 7,819. The Bureau of Municipal Research in Portland issued the following table: Number of fires from burning flues, 285; defective flues, 28; sparks, 83; electric wires, 25; burning grass, 32; burning grease, 15; burning brush, 23; cigars, 16; bonfires, 15; over-heated stove, 22; over-heated furnace, 10; matches, 16; total, 570.

The appalling feature of this wanton carelessness does not centre in the loss of material substances so much as it does in the loss of life. It is impossible to measure the hardships, suffering and death of those who barely manage to escape with their lives. If it were a condition impossible to overcome then we might accept the inevitable, but when we consider that the average per capita in the large European cities is only forty-nine cents then a condition confronts us which is worthy of immediate and prompt action. So much stress is laid upon the carelessness of using matches, cigarettes, etc. Are these not a factor in foreign life? The great difference in the annual loss by fire does not centre in the habits of the individual as much as it does the structural phases of our buildings. Let the various cities of Canada permit structures of inflammable materials to be erected in the heart of their commercial districts and all the laws imaginable will never prevent the great conflagrations with their tremendous destructive tendencies.

So many rules have been formulated which, in themselves, are admirable, but are necessitated through the shameful neglect of our councils and proper authorities. Why erect school houses which prove to be nothing more or less than fire traps and then try to escape the danger by constant fire drills? Why allow an office building of mill construction which will burn like chaff, and then force the owner to undergo the expense of a sprinkler system? Why encase the elevator shaft of a ten-story structure with fireproof walls and neglect the fire escapes? All preventives like the above are wholesome and should be enforced, but they must not be used as blinds to hide the real dangers.

Another factor working against the proper enforcement of fire protection was brought out in the recent investigation into the causes of the Woodbine Hotel fire, Toronto, where a number of lives were lost. The city building by-law states that all buildings exceeding thirty-five feet in height to be used as hotels must be fireproof throughout. This by-law was overruled by the Board of Control, who accepted plans calling for timber construction, one fire escape accessible through a private room, inside toilets, and electric wiring without conduits. Such power in the hands of incompetent men is one of the reasons why our cities are being continually threatened with fire disasters. If the modern up-to-date structures are to be erected with inflammable materials and license is given to disregard the simple factors of safety as stated in our building by-laws, then let the matter of fire escapes be carefully looked after, for herein lies the only means of protection. The accompanying cut of the Bell Telephone Company's building in Toronto exemplifies a proper consideration for the large number of employees, the fire escape connecting the two buildings and being amply lighted at each landing.

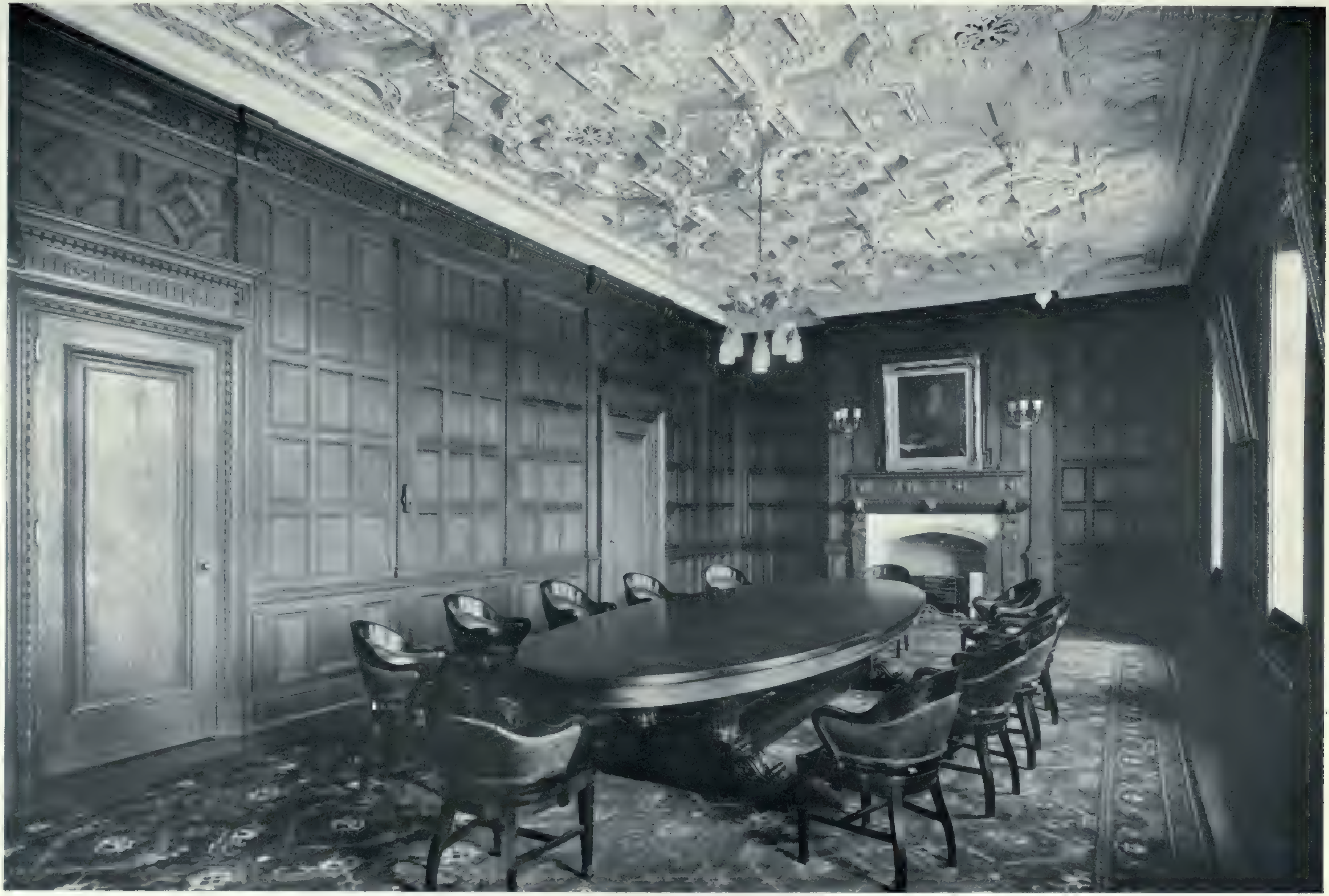


BELL TELEPHONE COMPANY BUILDING, TORONTO.

It is one of the unfortunate conditions in life that lamentable disasters are soon forgotten and thorough investigations do little more than pacify the public until its attention is attracted elsewhere. In order to eliminate the great conflagrations it will be necessary to have building by-laws providing for absolute fireproof structures with the inspection of same under one head, so that there will be no chance for the responsible party in case of neglect escaping due punishment. Furthermore, these laws must be final, with no opportunity for a prejudiced or unscrupulous board to set them aside. Then and only then will we reduce our fire loss to a minimum.

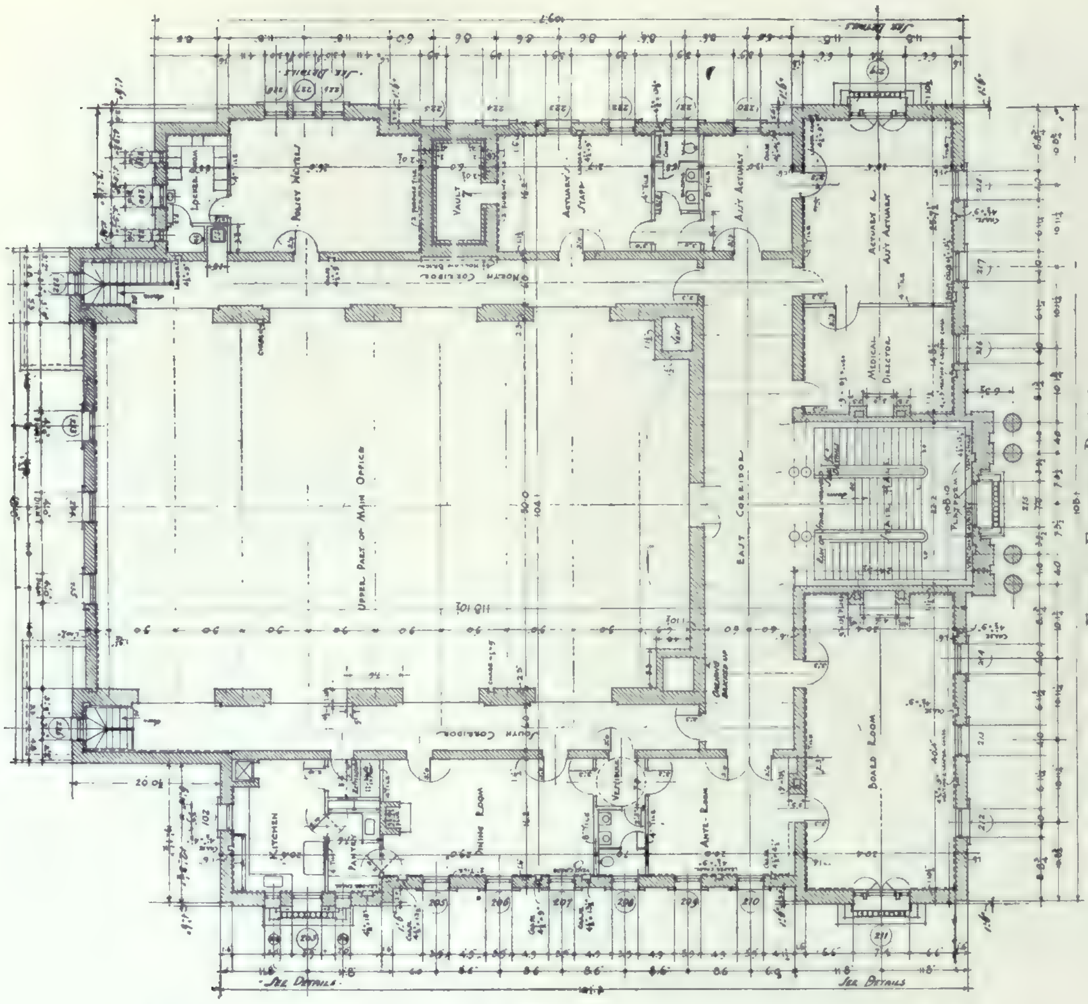
Tapestries brought into America during recent years —Their value to the future generations in the development of art along similar lines.

THE PRETENTIOUS and formal residence which plays such an important part in the lives of the present age, furnishes the incentive for enriching our country with the artistic treasures of former generations. No stone mansion or brick palace is complete without the large wall spaces upon the interior being covered with valuable tapestries. Each succeeding year finds many valuable examples taken from their European homes and brought into America to satisfy the ambitious rich. Eventually when these rare and priceless masterpieces become the property of public museums the inclination will be to study at home instead of in foreign fields. Tapestries date back many centuries, the Boston Museum of Fine Arts containing a Coptic woven in 400 B.C. The work sought after and which is more accessible as well as fitting for decorative purposes, belongs to the Middle Ages. The early Gothic excelled between the years 1475-1520, the Italian and Flemish shortly after. Under the patronage of royalty the French became supreme through the establishment of the Gobelins and Aubusson factories. The preservation of many valuable productions is due to the monasteries, who obtained the tapestries from the various castles when the owners were forced to engage in warfare. These monks influenced the subjects depicted since so many early examples are stories of religion. To obtain an idea of the value attached to some tapestries, one woven in Nuremberg during the latter part of the fifteenth century and now in this country, weighs six and one-half pounds and cost $40,000. The group "Scipio Africanus," acquired by an American, ranks among the greatest in existence, consisting of the three subjects, "L'Armee Navale," "La Conference," and "L'Incindie." Other well known tapestries brought to America are the sixteenth example of Flemish work depicting the lives of Henry II and Diana of Poitiers; the Barbarini collection of one hundred and thirty-five pieces on the Triumphal March of Charles V, made by weavers from Gobelins; the famous fifteenth century tapestries from the Bordac collection. Probably our best example was purchased by J. P. Morgan for the sum of $340,000. It is called the "Kingdom of Heaven," woven in Brussels in 1510, and belonged at one time to the King and Queen of Spain. Many others might be mentioned, which only goes to show the great inroad money has made upon this valuable phase of art among European countries. While deprecating such vandalism, still we cannot help but appreciate the great value accruing therefrom to future growth along æsthetic lines.

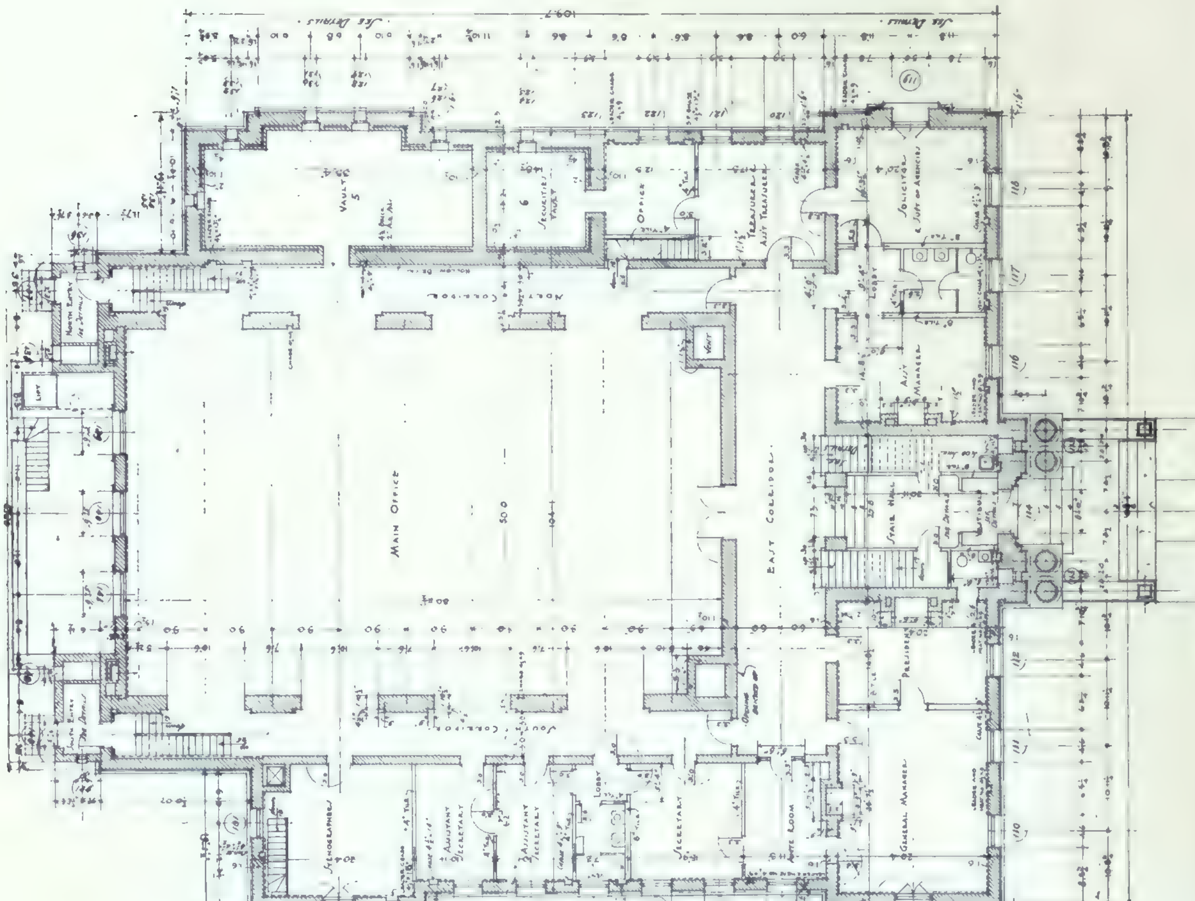


BOARD ROOM IN MUTUAL LIFE ASSURANCE COMPANY OF CANADA, WATERLOO, ONT.

DARLING & PEARSON, ARCHITECTS.



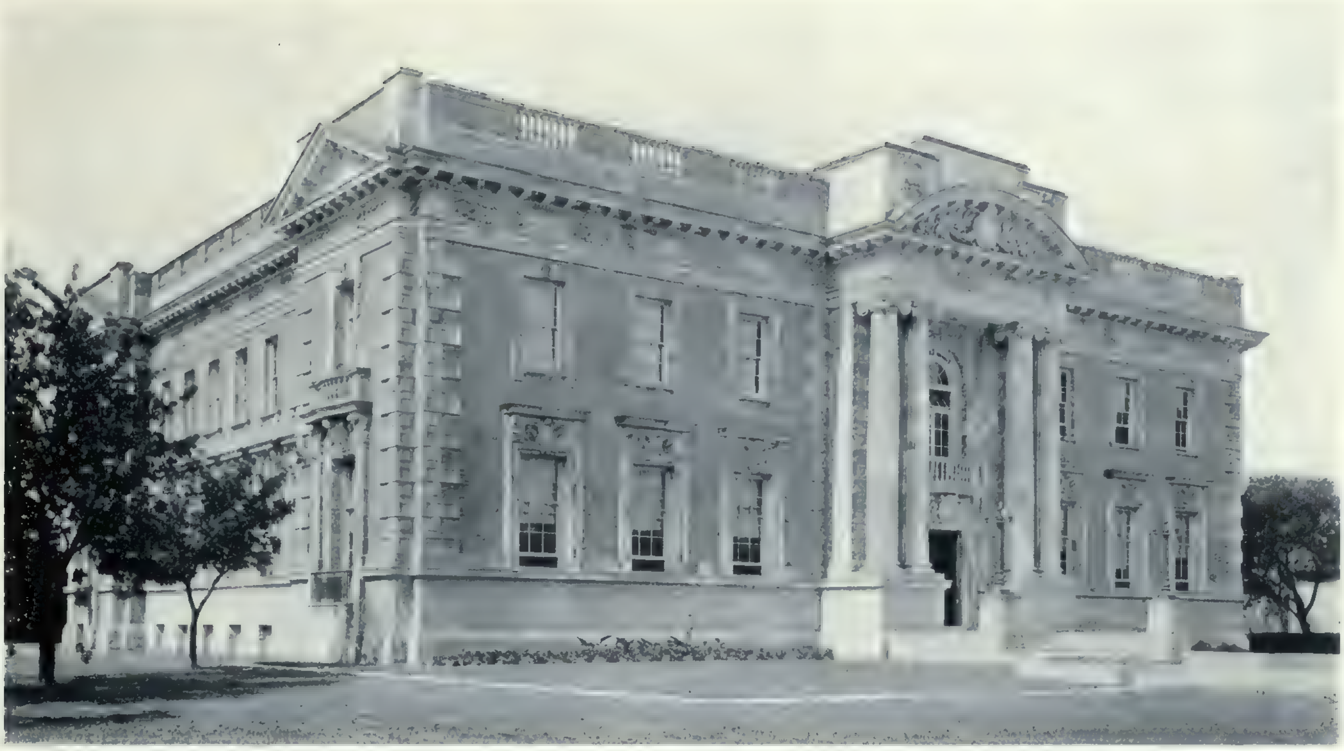
FIRST·FLOOR·PLAN



·GROUND·FLOOR·PLAN·

DARLING & PEARSON, ARCHITECTS.

PLANS OF MUTUAL LIFE ASSURANCE COMPANY OF CANADA, WATERLOO, ONT.



Waterloo, Ontario

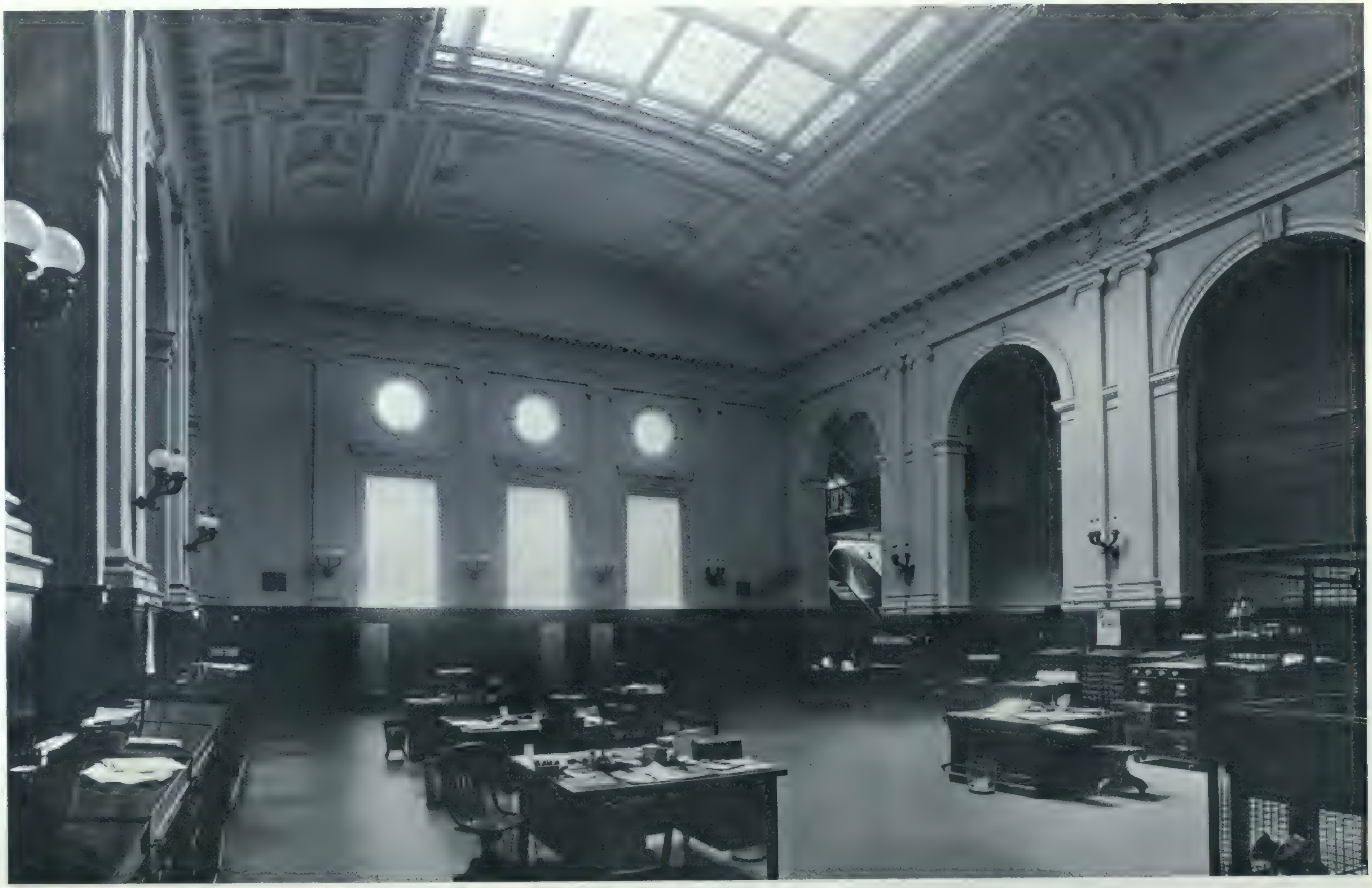
Building for Mutual Life Assurance Company of Canada

Darling & Pearson, Architects

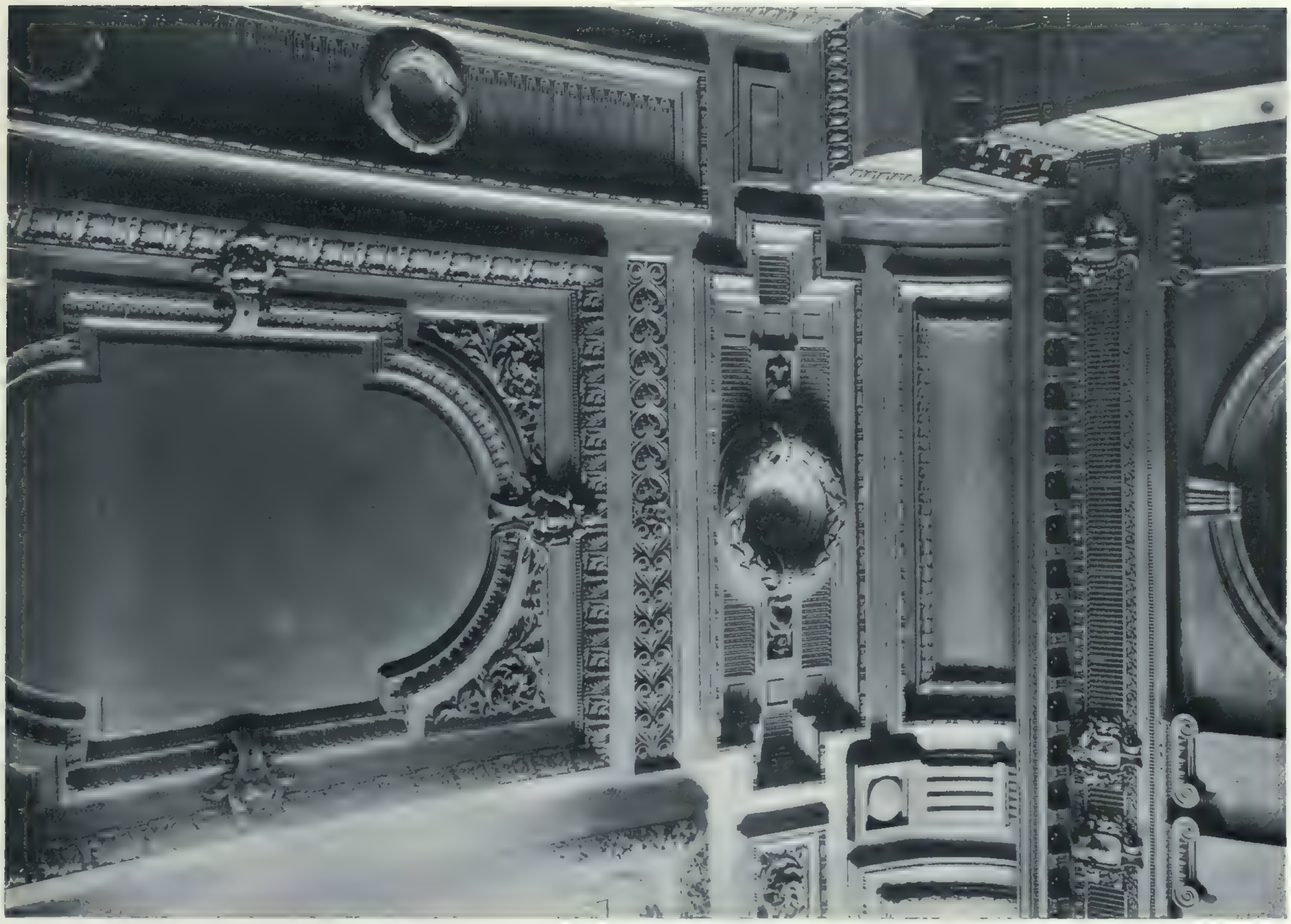
ONE of the characteristic signs of permanency and future growth in our smaller cities is the high class of buildings being erected. This fact alone is indicative of the commercial activities therein, without which no community can ever hope to reach a prosperous size. The town grows and if this progress is stunted by narrow minded citizens who feel that the structures of yesterday are good enough for to-day, there is little chance of its ever developing beyond the limitations of the people. This lack of confidence prevents internal growth and keeps away many foreign industries which would, otherwise, become established in that vicinity.

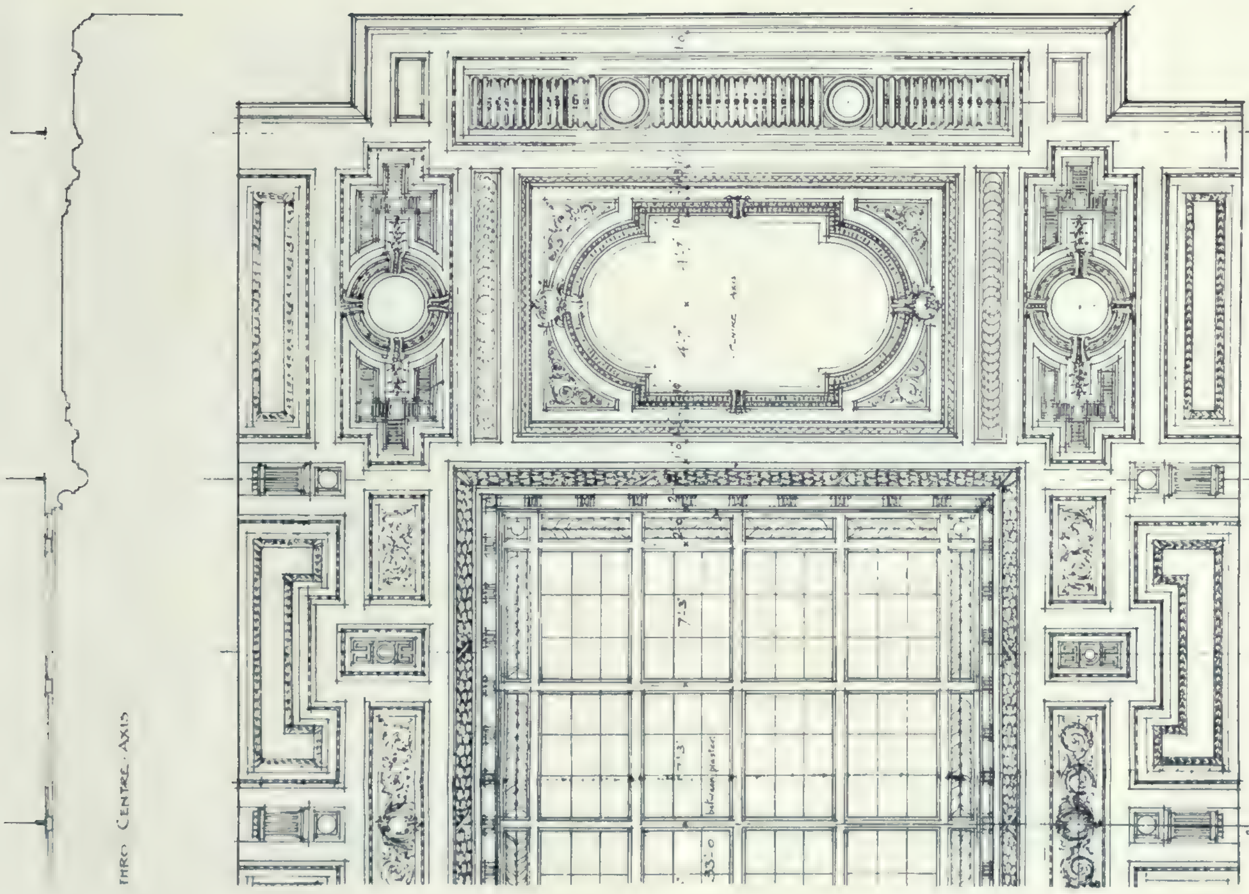
Waterloo may be justly proud of the Mutual Life Assurance Company of Canada building, which is typical of the progressive spirit in that community. It stands a dignified Renaissance structure of Canadian made buff brick and light terra cotta of a harmonizing nature. Directly in front of the building is a circular court paved with block stone in geometrical patterns. The whole lot is surrounded by a wrought iron fence eight feet high. Entering through walnut doors with heavy raised panels, one passes through the entrance hall, lined with Canadian marble, into the corridor, which is treated in plaster panels set between pilasters of verde antique marble and marble tiled walls. Surrounding and on the outside of the corridor are the office rooms with mahogany woodwork, plaster finish and quarter-sawed white oak. The building is fireproof throughout, heated from a boiler house some distance away, and ventilated by means of two exhaust fans located in a pent house on the roof. One of the fans exhaust the air from the main office and rooms on the first floor, the other from the toilet and locker rooms.

One other feature which hinders the growth of towns in addition to the lack of commercial enterprise, is the failure to look ahead and grasp the needs of future expansion. Once more Waterloo is to be commended for her progressiveness. The Civic Association of Berlin and Waterloo—two adjoining towns—engaged C. W. Leavitt, of New York City, an expert on town planning, to prepare an elaborate scheme covering improvements of existing conditions and systematic studies for the future. Mr. Leavitt presented an extended report along with the plan. After reviewing the history and settlement of that district, which commenced in 1799, he states that Berlin has a higher sea level than Gravenhurst, in the so-called Highlands of Ontario, which is less than 900 feet. The highest point on the Grand Trunk Railway in the same region has an elevation of 1,197 feet, while Waterloo County has an average elevation of 1,100 feet. The heart of the peninsula of Southwestern Ontario with its vast surrounding fresh water expanses, the great lakes forming a

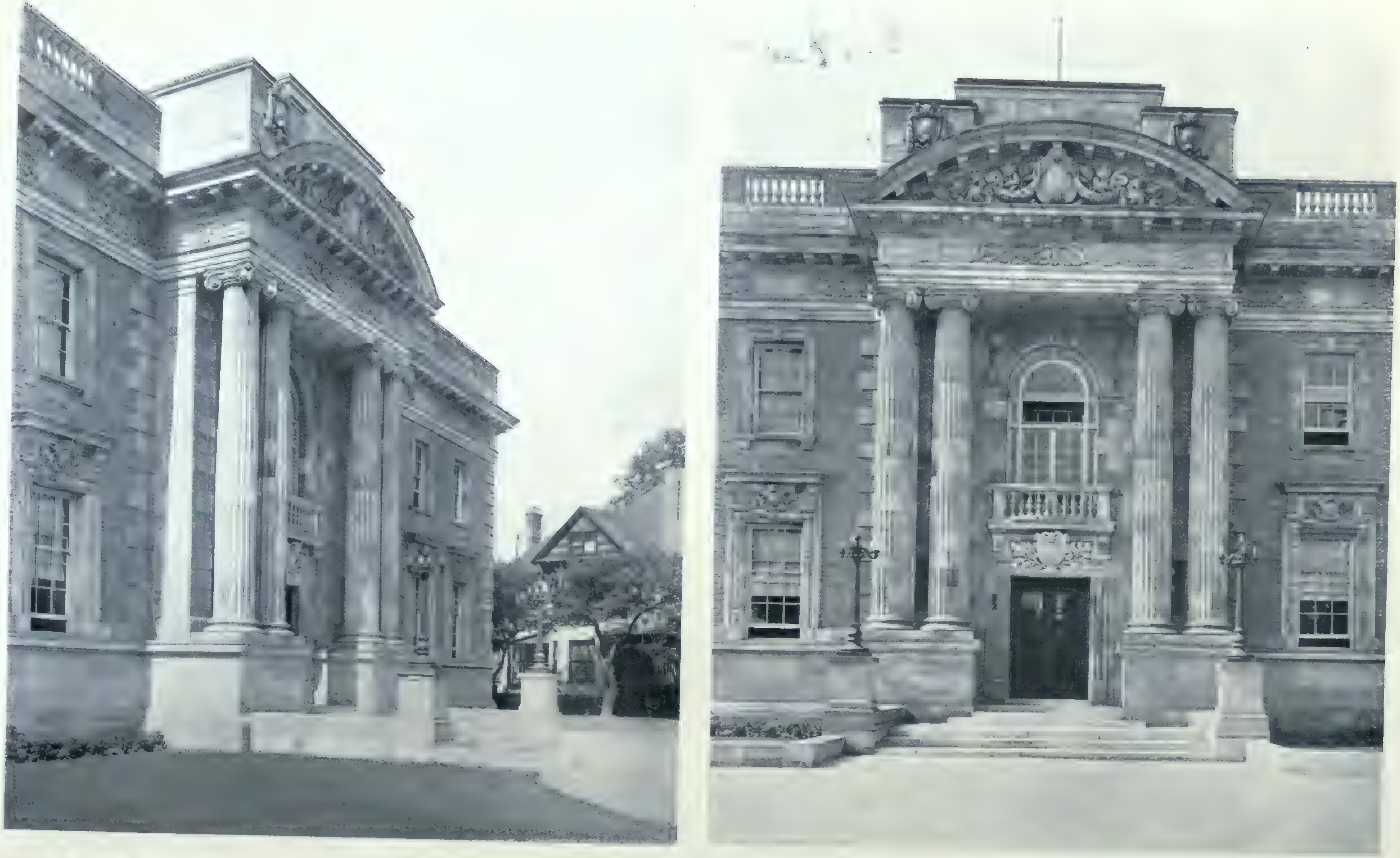


MAIN OFFICE. MUTUAL LIFE ASSURANCE COMPANY OF CANADA, WATERLOO, ONTARIO. DARLING & PEARSON, ARCHITECTS.





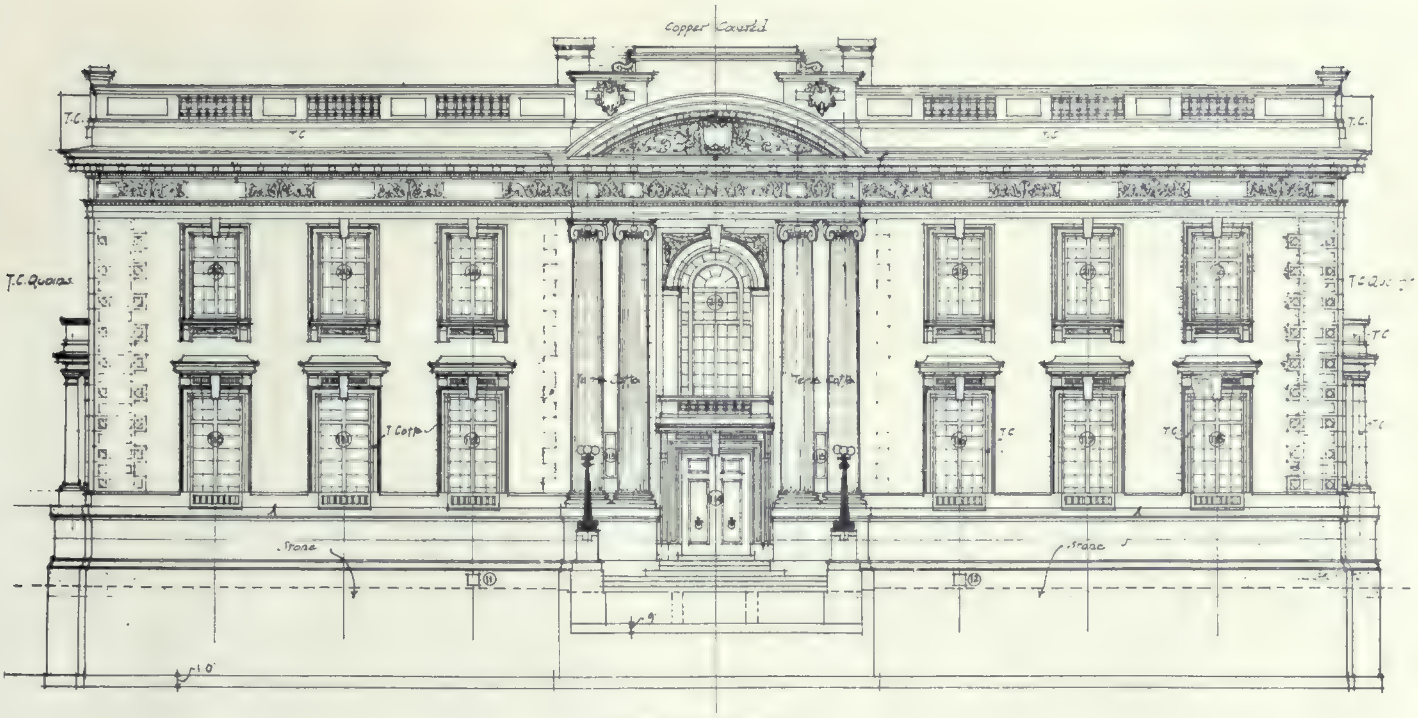
DETAILS OF CEILING IN MAIN OFFICE. MUTUAL LIFE ASSURANCE COMPANY OF CANADA, WATERLOO, ONTARIO. DARLING & PEARSON, ARCHITECTS.



DETAILS OF MAIN ENTRANCE.

MUTUAL LIFE ASSURANCE COMPANY OF CANADA, WATERLOO, ONT.

DARLING & PEARSON, ARCHITECTS.

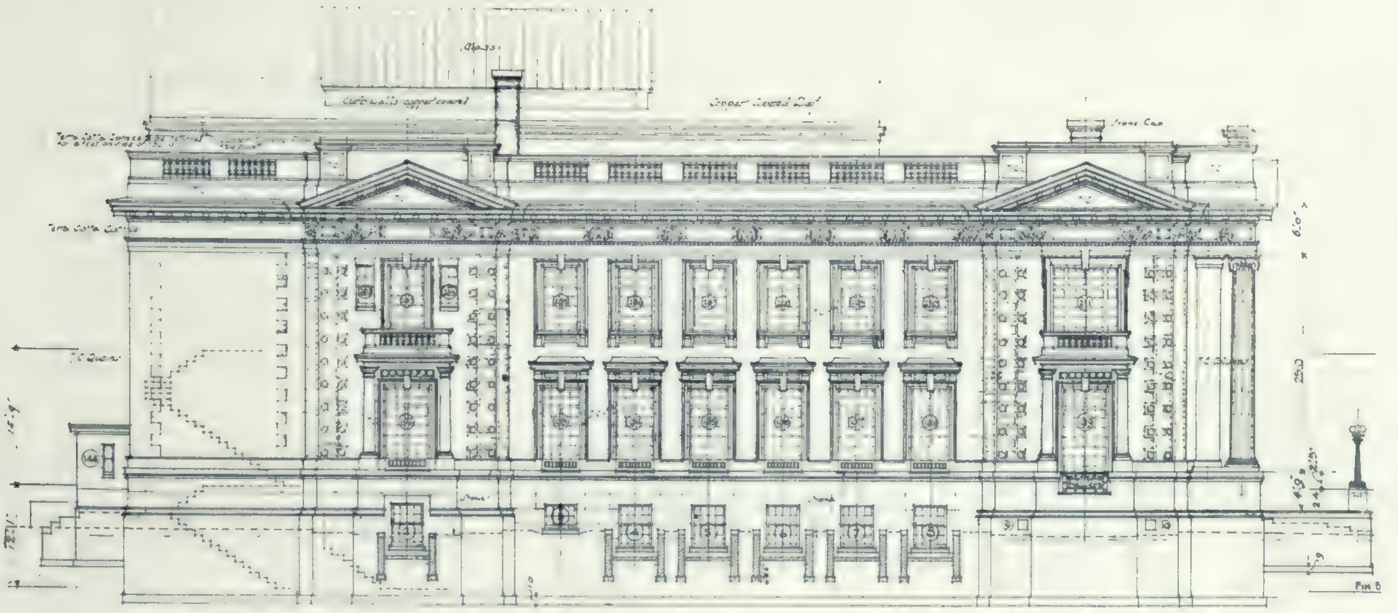


EAST ELEVATION.

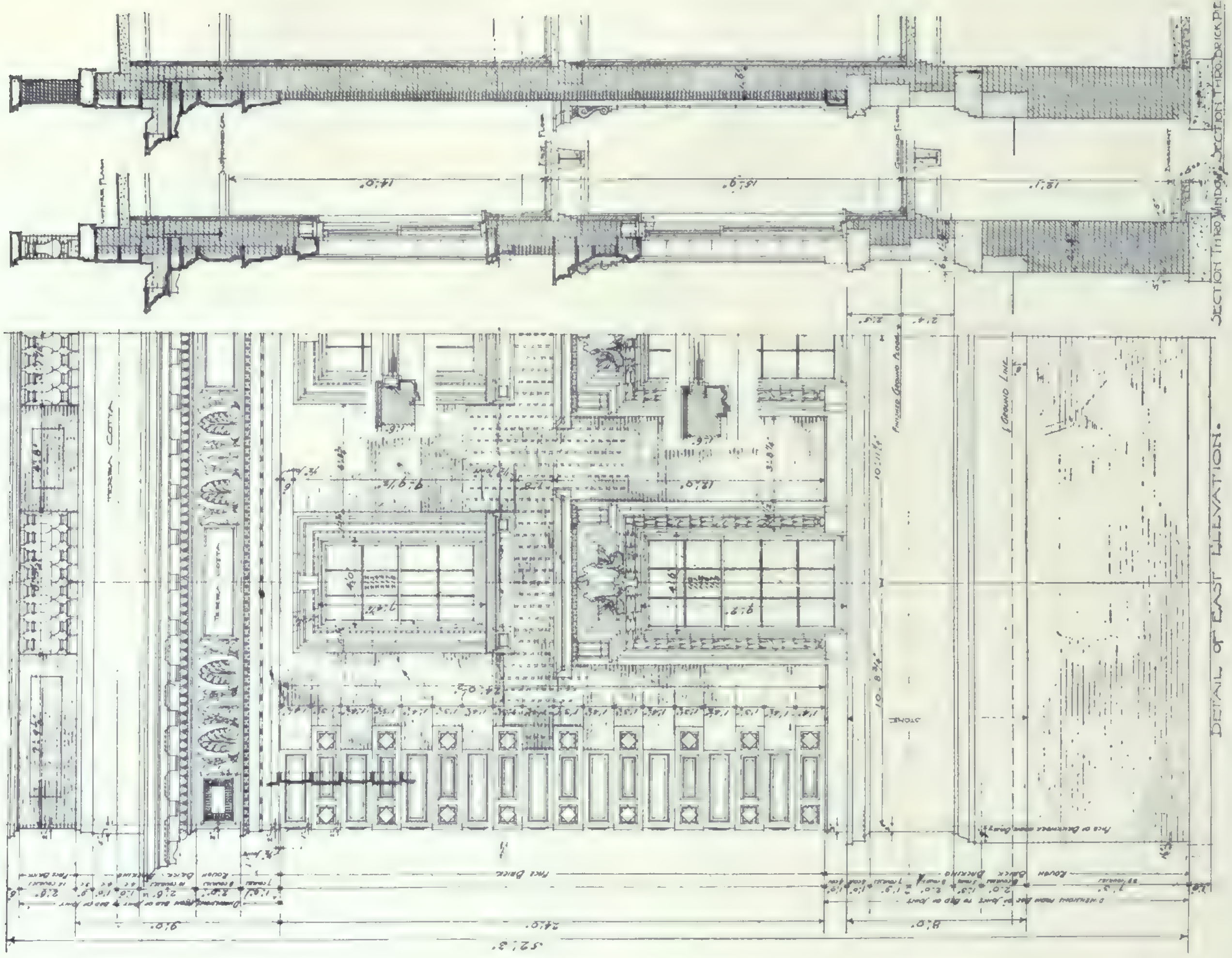
barrier against extreme meteorological disturbances, a fine salubrious climate combined with extraordinary fertile land, well watered, and with never extreme periods of drought. "Such," he says, "are the attractions for settlers and such remain the unique advantages of this territory."

In predicting a population of 100,000 for Berlin and Waterloo in twenty-five years, Mr. Leavitt says that these are large figures and bear analysis. The increase in this vicinity from 1903 to 1913 is 75.2 per cent., from 1904 to the conservatively estimated figure for the present year, the increase is 82 per cent. Applying the smaller percentage for two successive decades and half a decade more is obtained in twenty years from 1914, 60,650, and in twenty-five years 83,450 for Berlin alone, not counting Waterloo, which adjoins, and which is already in many respects part of the same community, and not counting on the tendency of city growth to increase in ratio as population increases. The people of Berlin and Waterloo, it is said, see other larger cities performing gigantic operations to rectify past mistakes, see them loading themselves with debt to pay the price of these necessities, and have decided to forestall such waste as far as possible, and to plan in order that their people should have a well ordered and convenient city where health and wealth may go hand in hand; where the children can be reared and educated in environment which, built upon clean, intelligent and useful lines, will insure good citizenship and make them permanent citizens of the locality.

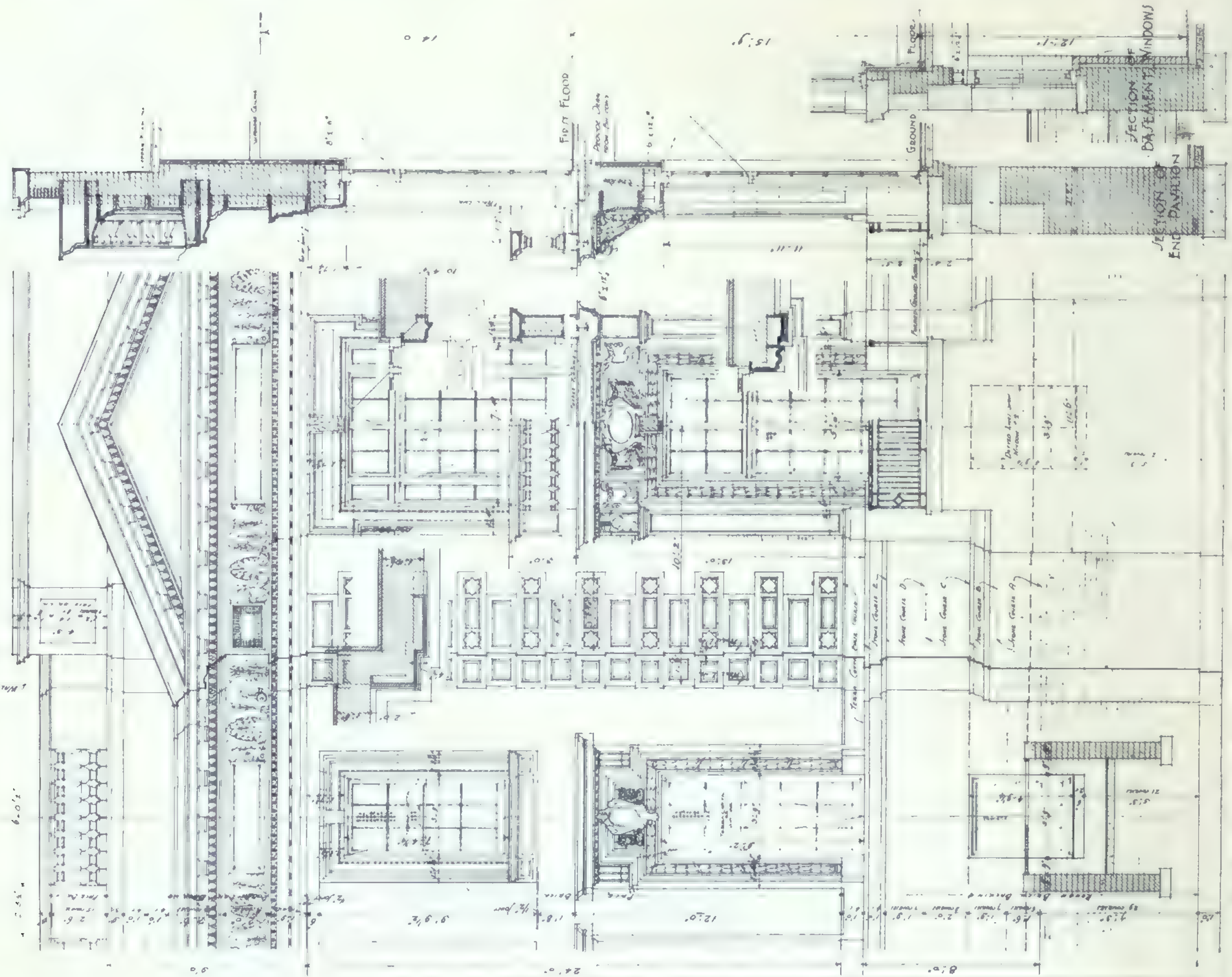
The association being formed of active citi-



SOUTH ELEVATION.



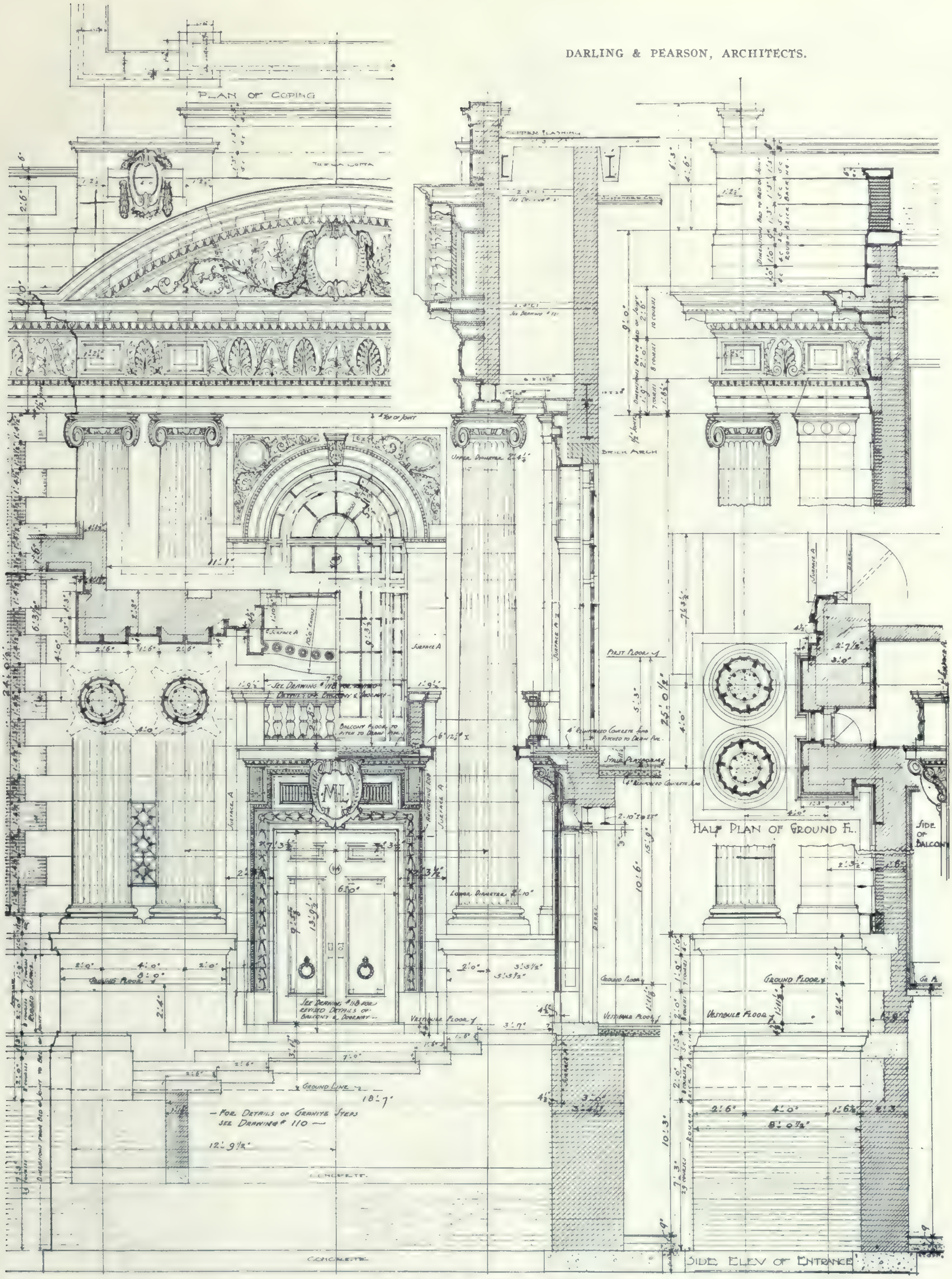
DETAILS OF EAST ELEVATION.



DETAILS OF NORTH ELEVATION.

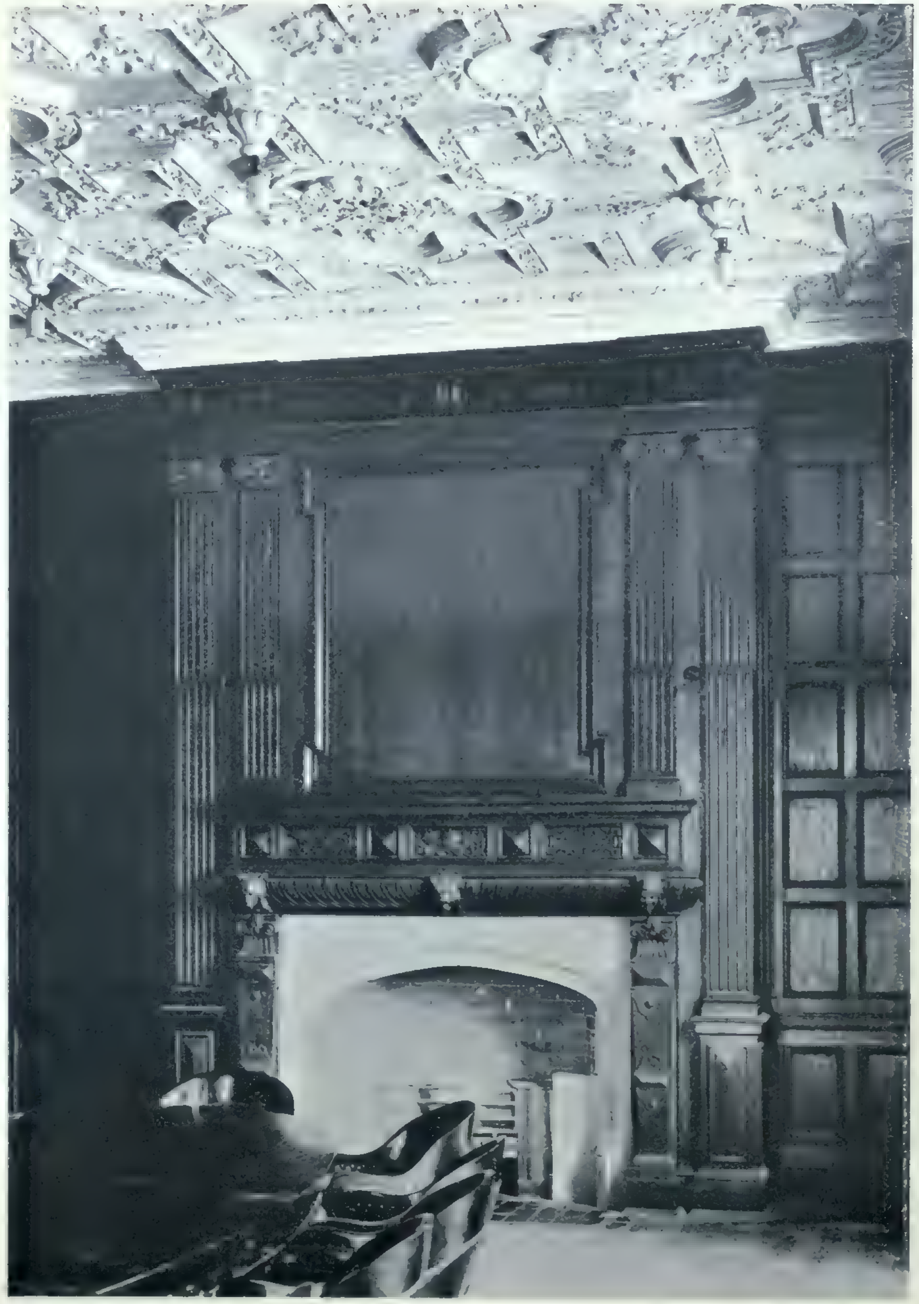
MUTUAL LIFE ASSURANCE COMPANY OF CANADA, WATERLOO, ONT.

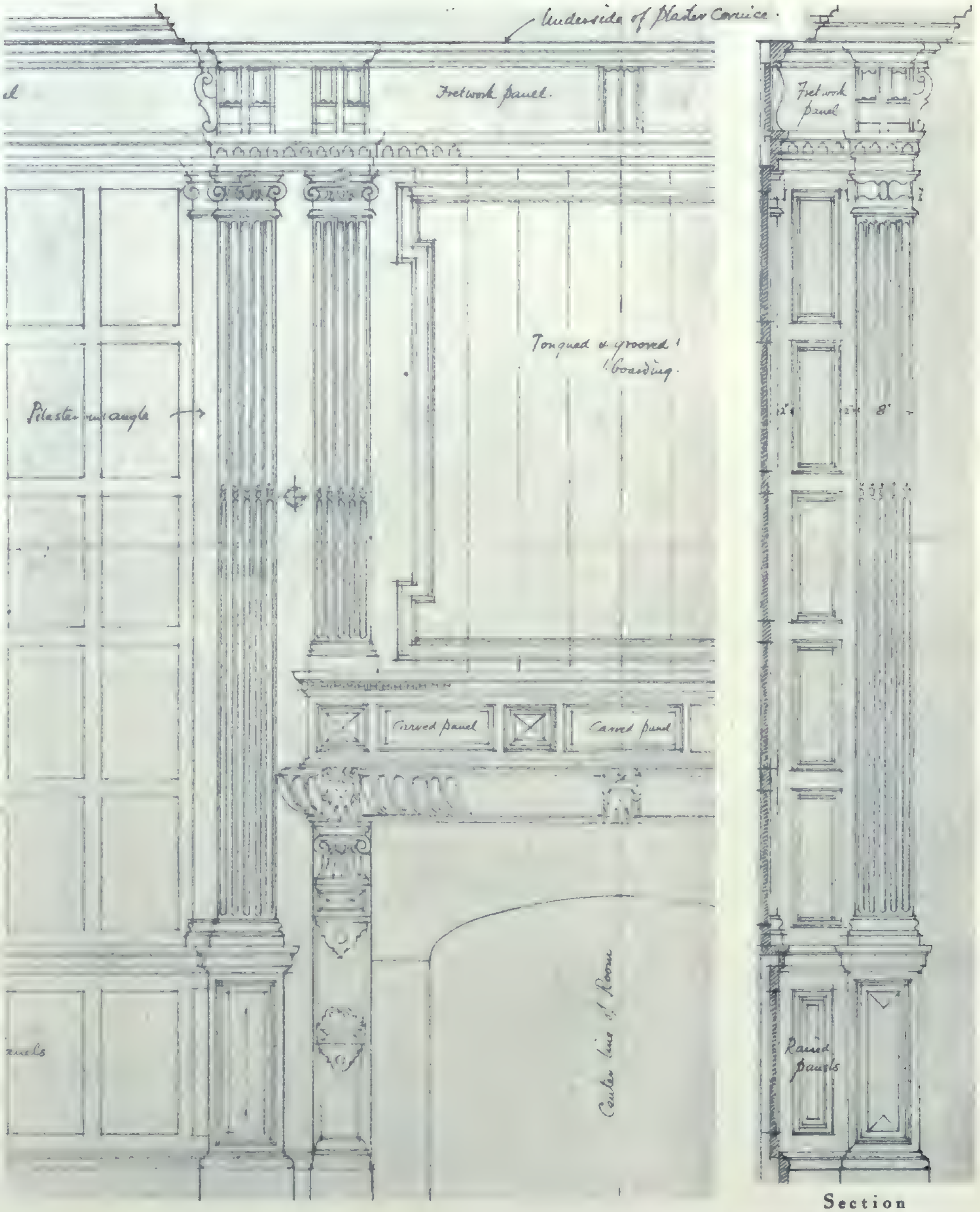
DARLING & PEARSON, ARCHITECTS.


DARLING & PEARSON, ARCHITECTS.

DETAILS OF MAIN ENTRANCE.

MUTUAL LIFE ASSURANCE COMPANY OF CANADA, WATERLOO, ONT.





DETAILS OF FIRE PLACE.

MUTUAL LIFE ASSURANCE COMPANY OF CANADA, WATERLOO, ONT.

DARLING & PEARSON, ARCHITECTS.

zens found the task a large one and committees were appointed to deal with the different phases of the work and worked in conjunction with the expert.

Among the main features suggested by Mr. Leavitt is that a wide boulevard encircling the city should now be laid out, 300 feet wide, to form the connecting link between the proposed parks. A union station is planned for all the railways, close to the present G.T.R. passenger station. Space has been provided for additional colleges and universities, public and separate schools. The expert advises that a limit to the height of all buildings is imperative. The consequences from skyscrapers must result badly for the lives of the people. The congestion of traffic, lack of proper light, poor ventilation, are only a few of the evils that may beset cities.

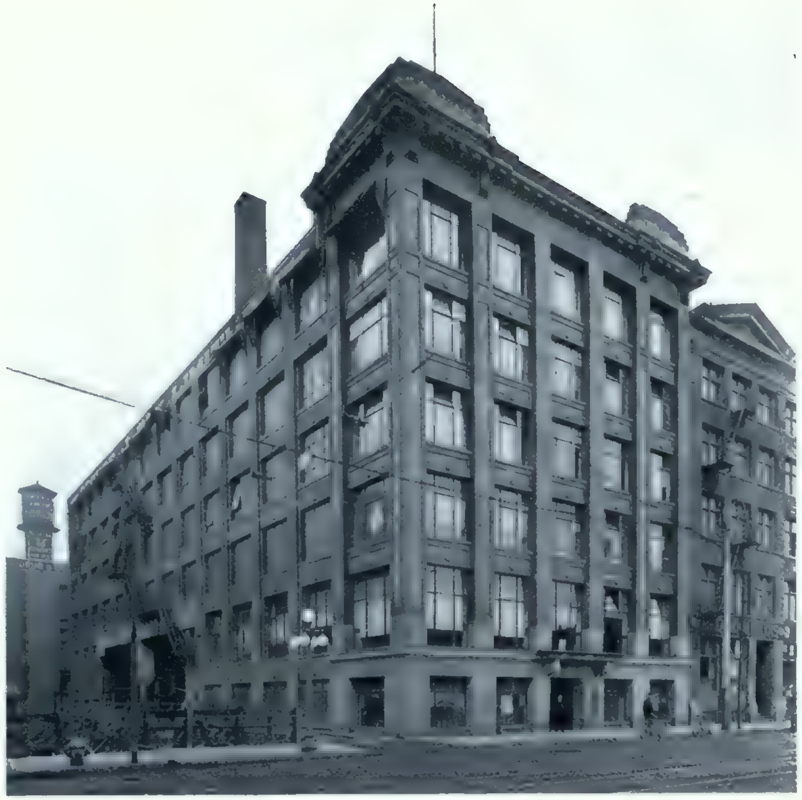
CEILING DETAILS, MAIN OFFICE.

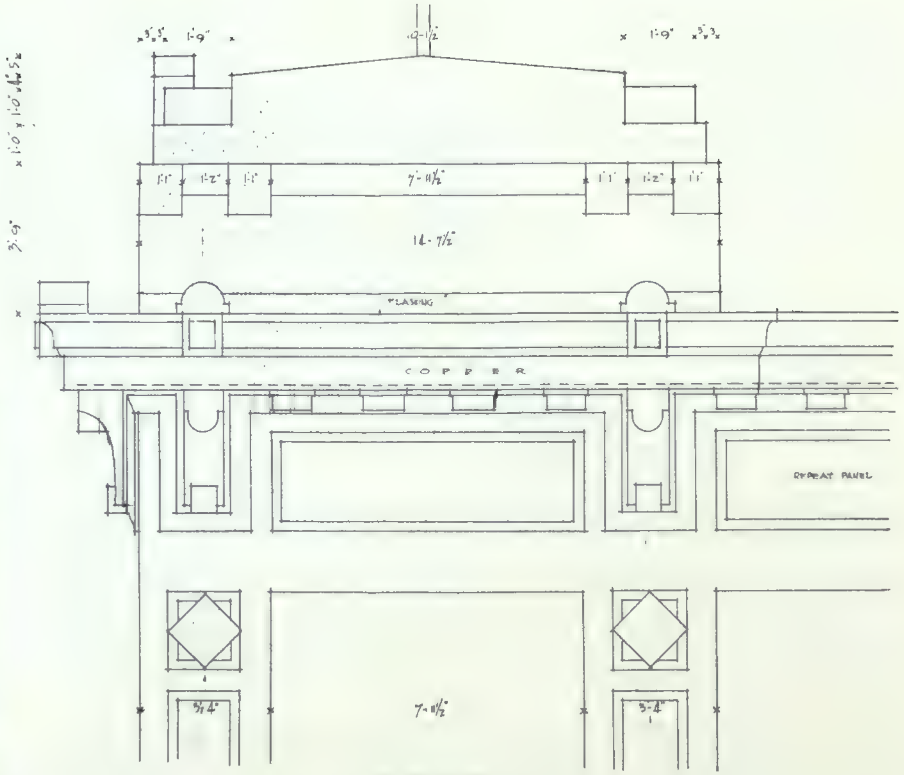
IT IS MOST encouraging that the towns and cities of Ontario are awakening to the importance and advantages of Town Planning and Improvement. The larger cities of Canada and America have already become active in this respect. They have realized that if they are to escape the mistakes of older cities, and avoid the conditions which make possible these mistakes, they will require an active, constructive policy with respect to transportation, housing and sanitation. The time has come for national and provincial effort and for concentrated action in each community.

In most large cities nearly everyone has been bent on money-making, and a community thus absorbed can hardly be expected to give serious thought to the welfare of future generations or to the benefits which arise from the attractiveness of the home city. Now, however, a change is taking place. This is evidenced by the fact that over fifty Canadian and American cities have adopted some course for improvement of existing conditions and systematic plans for the future.

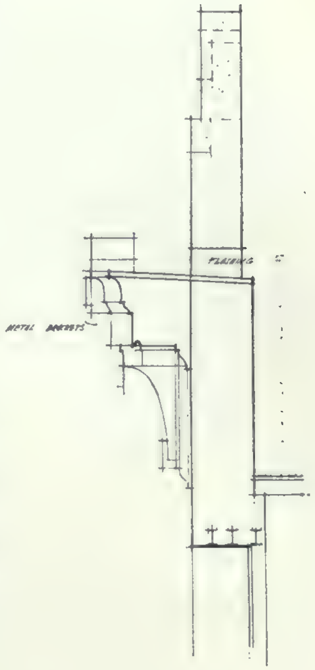
The general subject of civic planning embraces all of those allied subjects such as street routes and widths, depths of blocks and lots, buildings, street circulation and transportation; housing with its light and air problems, sanitation and cleanliness, railroad locations, distribution of factory areas, parks, playgrounds, boulevards and in general all matters which influence the lives of the people in the community.

The ideal, therefore, of city planning is that in which all these branches are harmonized to secure for the people of the city such conditions as will obtain a maximum of efficiency in work and of enjoyment of life; in other words, to make the city a good place to work and live in. —*C. H. Mitchell, C.E.*





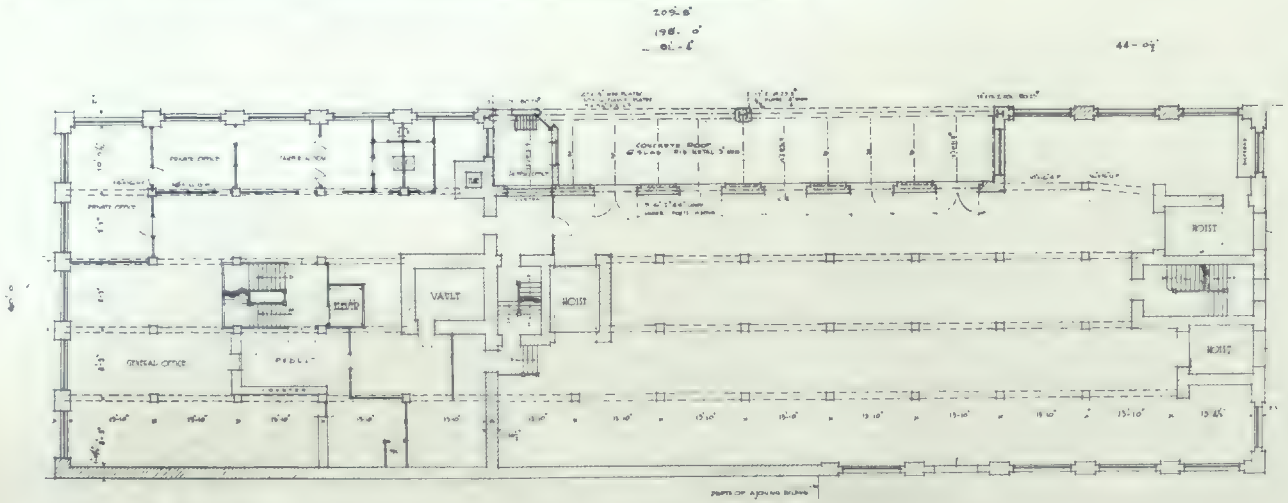
· ELEVATION ·
ONE HALF INCH SCALE



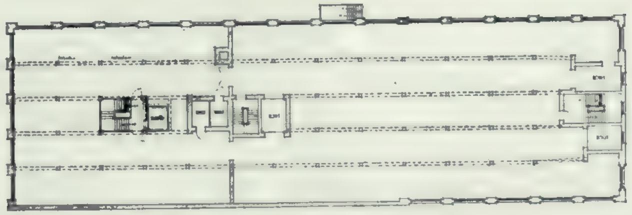
· SECTION ·
ONE HALF INCH SCALE

T. J. FOY COMPANY BUILDING,
TORONTO, ONTARIO.

CURRY & SPARLING, ARCHITECTS.



FIRST FLOOR PLAN.



TYPICAL FLOOR PLAN.

Office and Loft Buildings, Toronto, Ont.

TORONTO, like the other large cities of Canada is constantly erecting all types of commercial buildings which are an important factor in the artistic appearance of the neighborhood in which they are built. Several illustrations are given herewith which are characteristic of the work being done, together with brief description.

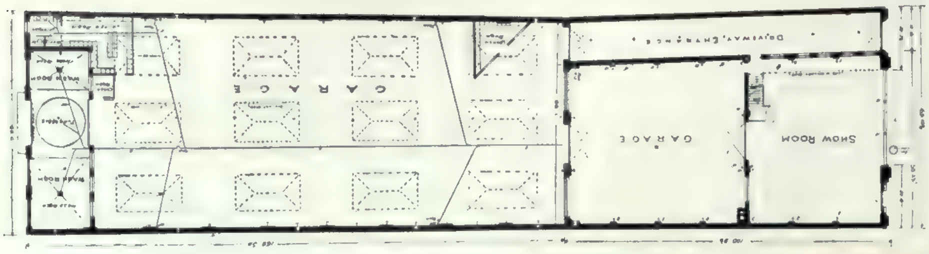
G. J. Foy Company.—This building carries out to a large degree the necessary requirements for structures of this kind erected in the vicinity of Toronto. It is of mill construction with extra heavy posts and beams supporting a seven-eighths inch maple flooring laid on asbestos roofing material which in turn covers two by five inch spruce pieces set on edge and well spiked together. The several floors are designed to carry from one hundred and fifty to four hundred pounds per square foot, regulated by the nature of the goods consigned to each floor. For the sake of economizing space the upper part is extended over the shipping well and carried on heavy box girders. The building proper is planned with the elevators and stairways so located that the upper floors may be let to different parties with proper accommodations for each division. The front or office portion is separated from the warehouse by a heavy wooden wall with double fireproof doors in order that only one portion of the building can be affected by fire at the same time. An additional protection is furnished by the installation of a sprinkling system. The sides and rear of the structure are equipped with steel sash; the work below ground being of concrete, thoroughly waterproof. The cost of the building was $200,000.

Wolseley Motor Car Company.—Erected on one of the residential streets, this building has been carefully designed in red brick and Indiana limestone. Hardwood floors have been used in the showroom with suitable trimmings. The structure is of concrete and iron construction, making it thoroughly fireproof. Lockers, storerooms, etc., have been arranged in the basement in addition to the steam heating plant. The building cost $60,000.

Crown Tailoring Company.—This building is designed in red stock brick and artificial stone of a harmonious shade. Mill construction has been used throughout, the roof being treated with asbestos. The office has been tastily handled in Circassian walnut. Sprinkler and steam heating systems have been installed. The coal in the large bin feeds itself automatically into the boiler by means of a concrete hopper floor. The cost of the building was $50,000.

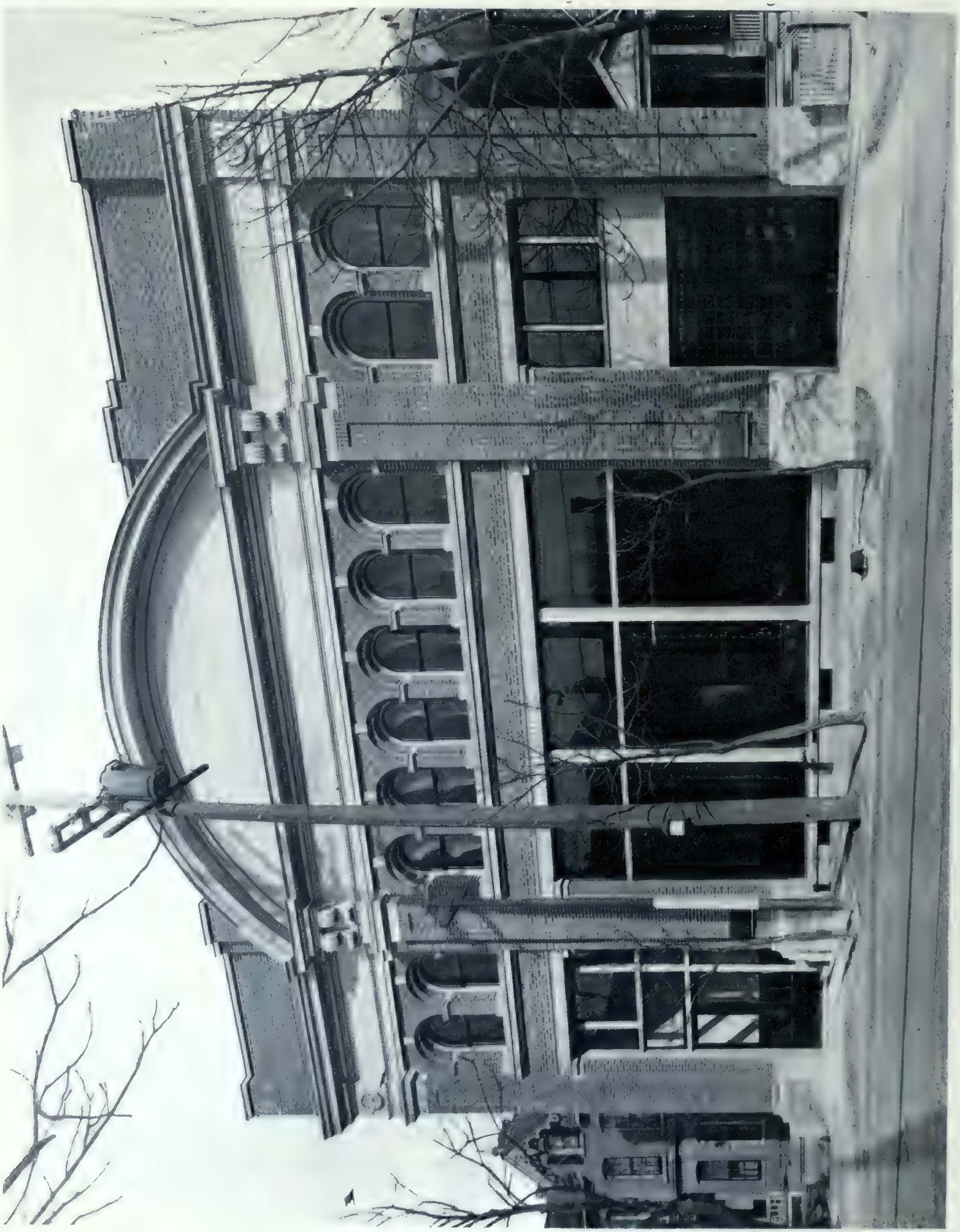
Temple-Pattison Building.—The exterior is of red brick and artificial cut stone. Built of mill construction, the floors are of Georgia pine and maple with asbestos between, and designed

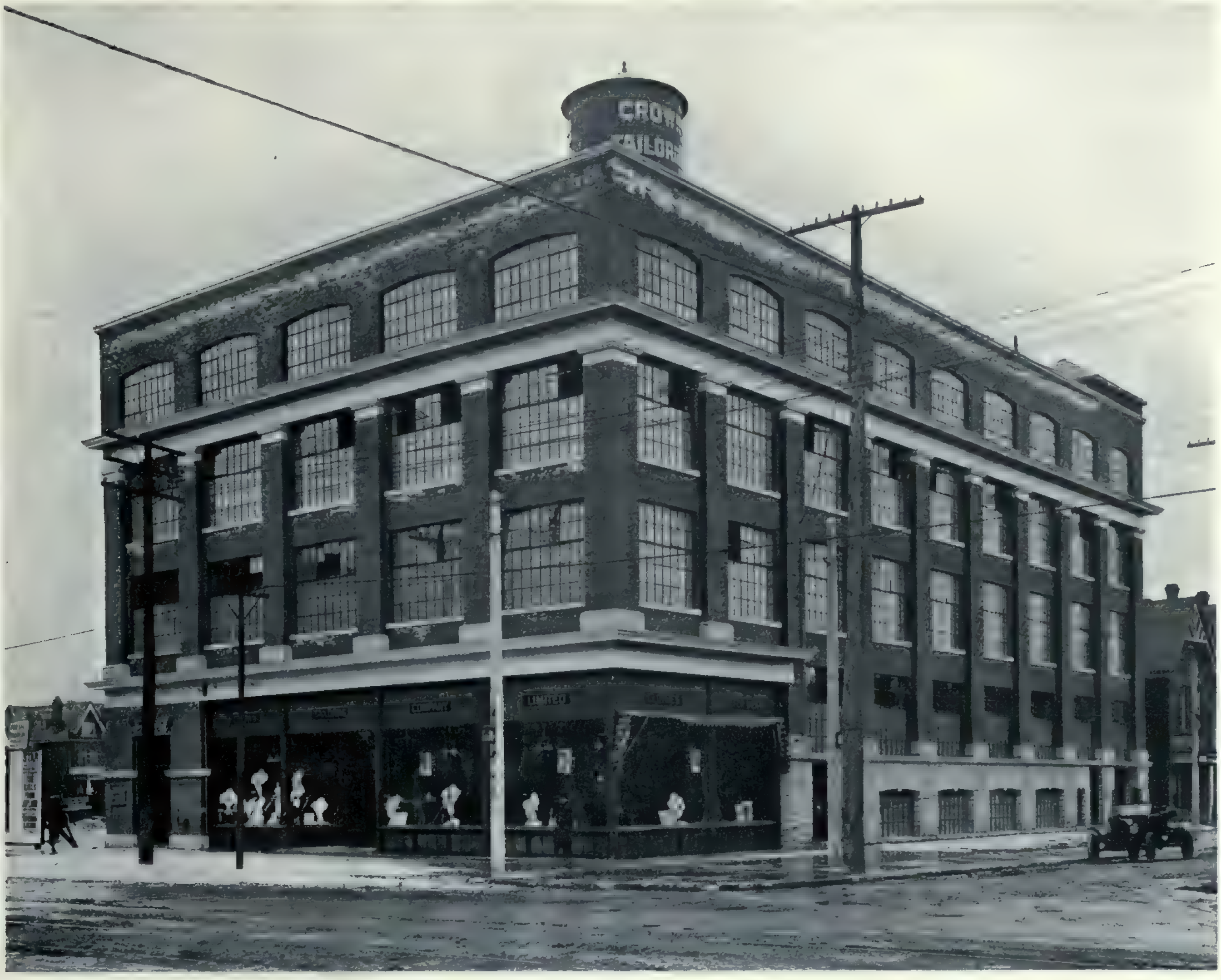
ENTRANCE LOBBY OF G. J. FOY COMPANY'S BUILDING.

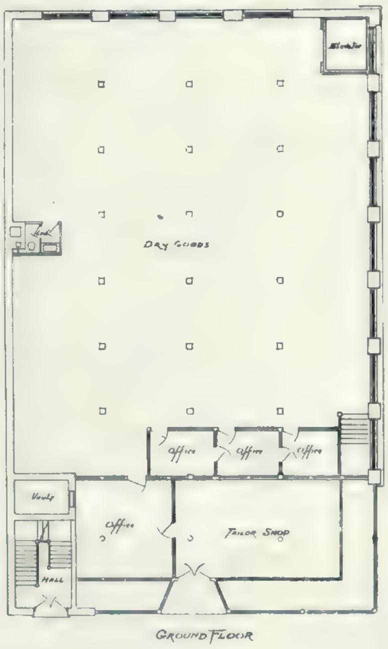


WOLSELEY MOTOR CAR COMPANY BUILDING, TORONTO, ONT.

E. J. LENNOX, ARCHITECT.







CROWN TAILORING CO. BUILDING.

C. F. WAGNER, ARCHITECT.

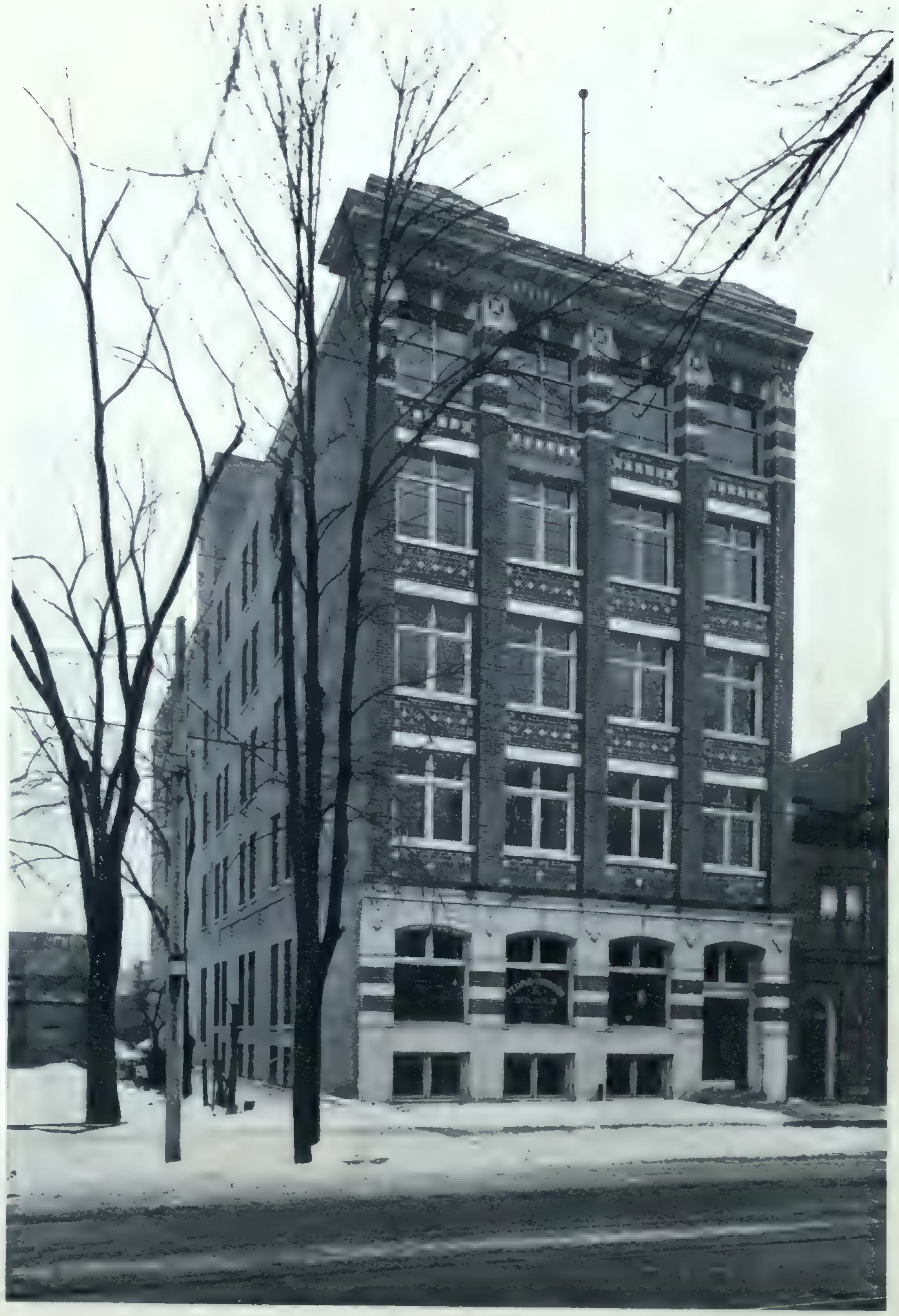
to carry a load of 150 pounds. The windows are of steel frame; the walls plastered and painted white. Cost of building, $50,000.

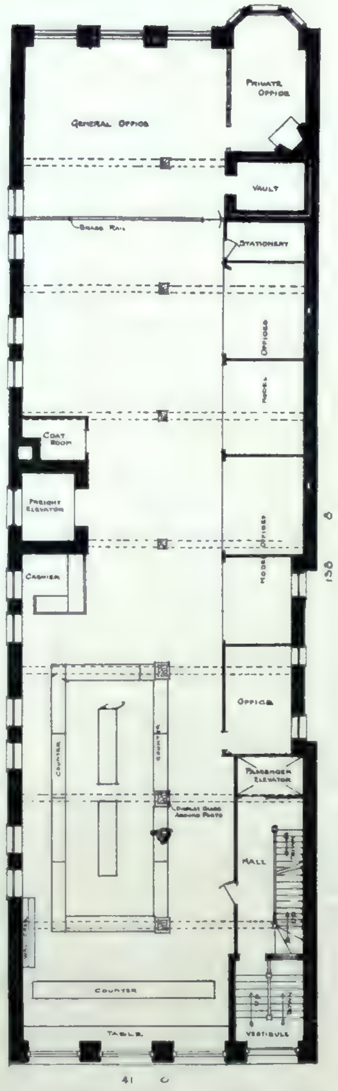
Hermant Building.—Built for the Imperial Optical Company, it represents one of Toronto's latest and most up-to-date office structures. It is of the skeleton type, constructed entirely with reinforced concrete and finished in a light shade of semi-matt glaze terra cotta above the first story, which is faced with stone. The terra cotta is secured to the piers by a system of plates and anchors supporting the weight at each floor. Vertical rods run the entire height of the building, to which the concrete is anchored in every case by heavy galvanized iron anchors. In order to secure a maximum amount of light, steel mullions and spandrels are placed between the concrete columns in the front facade. The floors and stairs are of concrete finished with terrazzo; the sash entirely of steel. Passenger and freight elevators have been installed, as well as a system of steam heating. The cost of the building was $85,000.

Chapman & Walker Building.—The design is in maroon tapestry brick and artificial stone. Built of mill construction, hardwood floors, metal frame and wire glass above ground and first floor, which has plate glass. Buff pressed brick is used for the walls of the ground floor. Cost of building, 14 cents per cubic foot.

Cooper Cap Company.—The building is of mill construction, with exterior of red pressed brick, artificial stone trimmings, and gravel roof. Upon the interior the offices are of quarter-cut oak, all other floors being of maple. Vaults are supplied on all floors; freight and passenger elevators; sub-basement for heating plant under driveway at end of building; vacuum and low pressure heating systems. Cost, $70,000.

Buildings of a similar character from other cities will be illustrated during the coming months as a stimulus to better work.

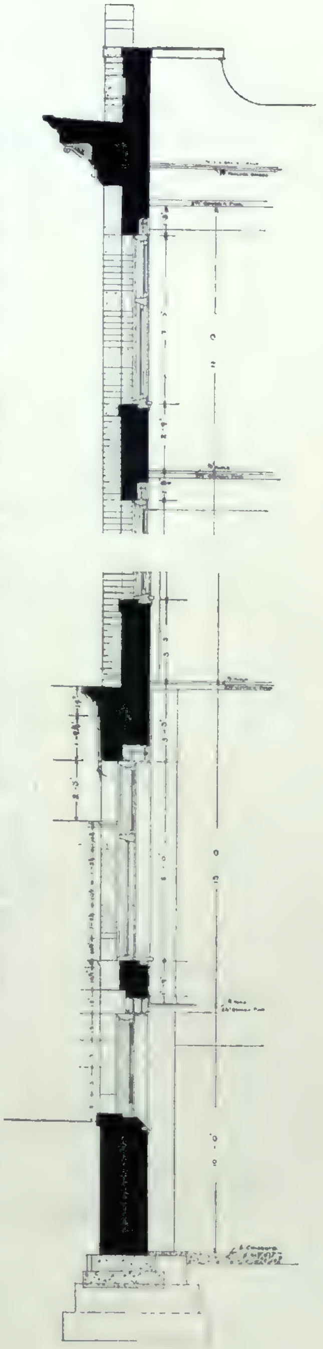


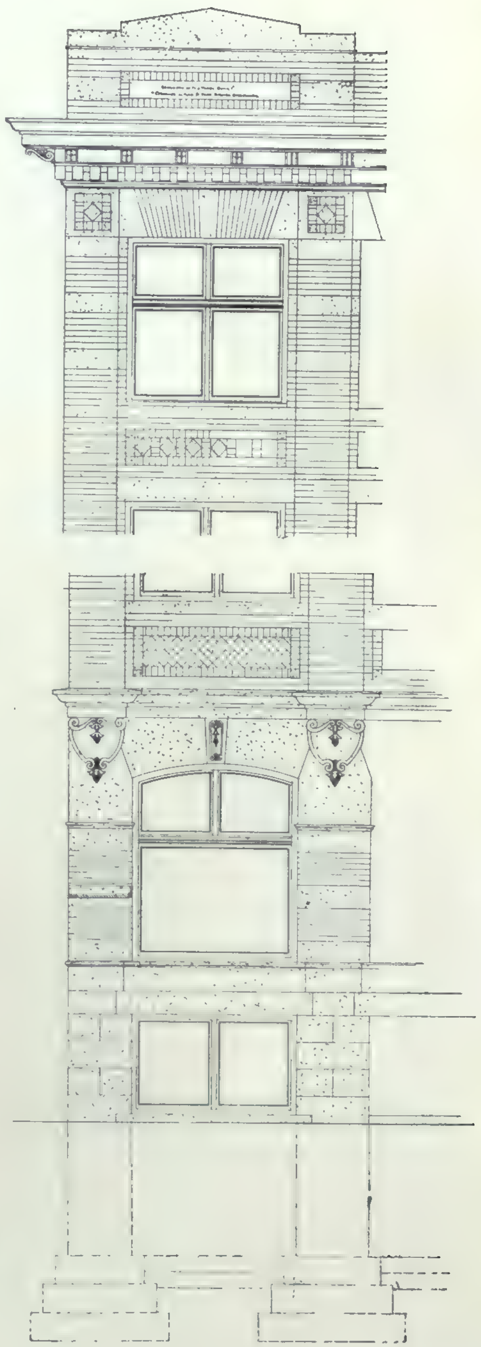


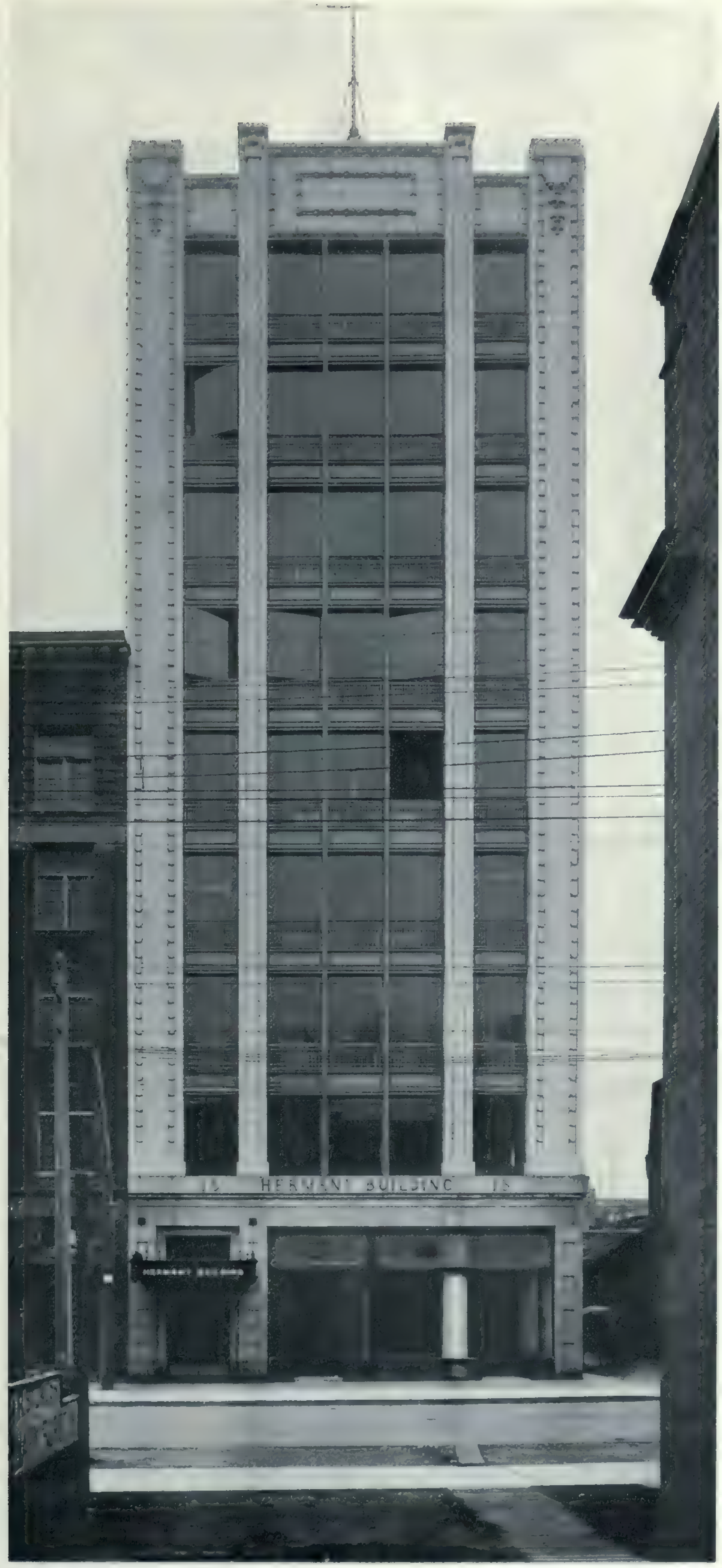
Ground Floor

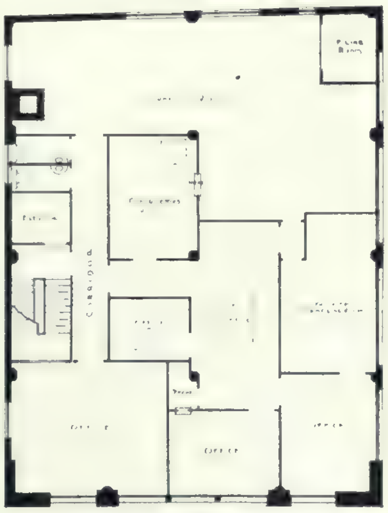
TEMPLE-PATTISON
BUILDING.
TORONTO, ONT.

DENISON & STEPHENSON,
ARCHITECTS.

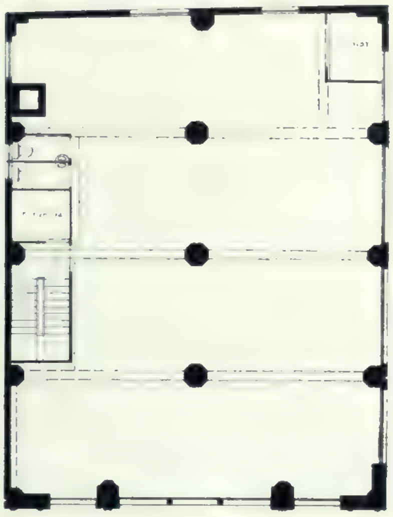








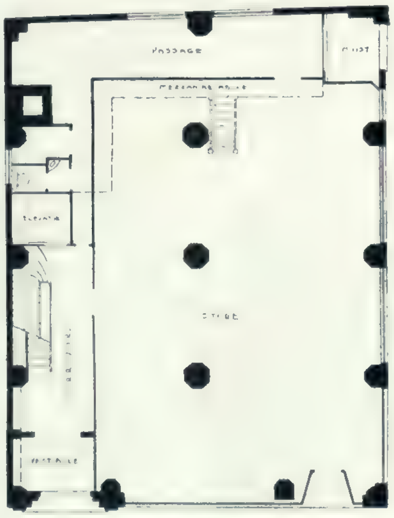
NINTH FLOOR



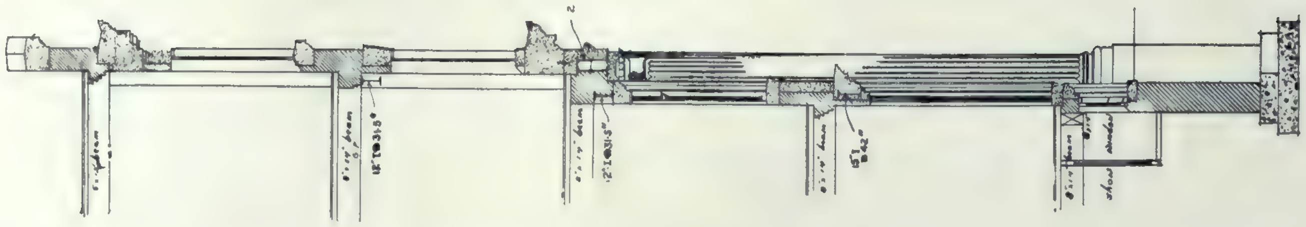
TYPICAL FLOOR

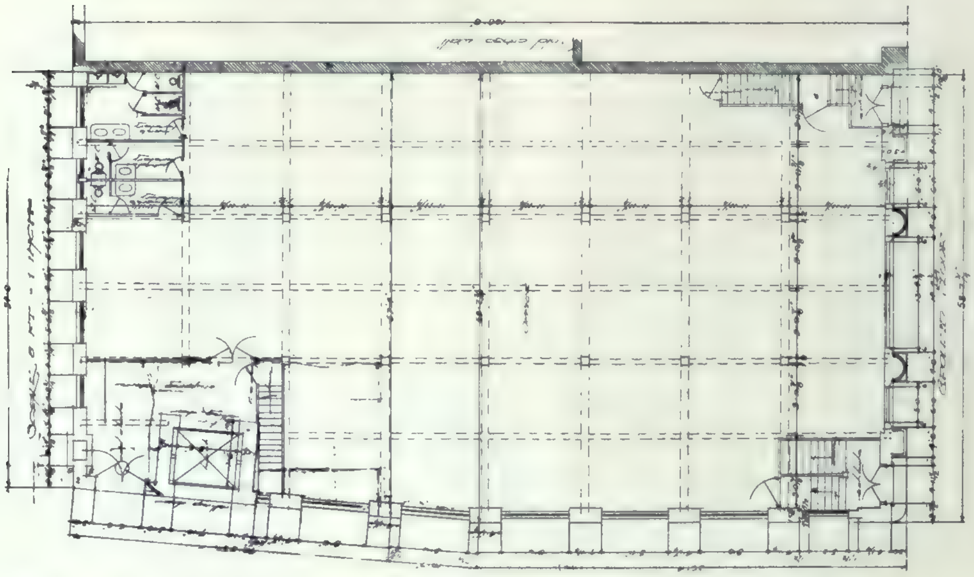
HERMANT BUILDING,
TORONTO.

BOND & SMITH,
ARCHITECTS.



FIRST FLOOR

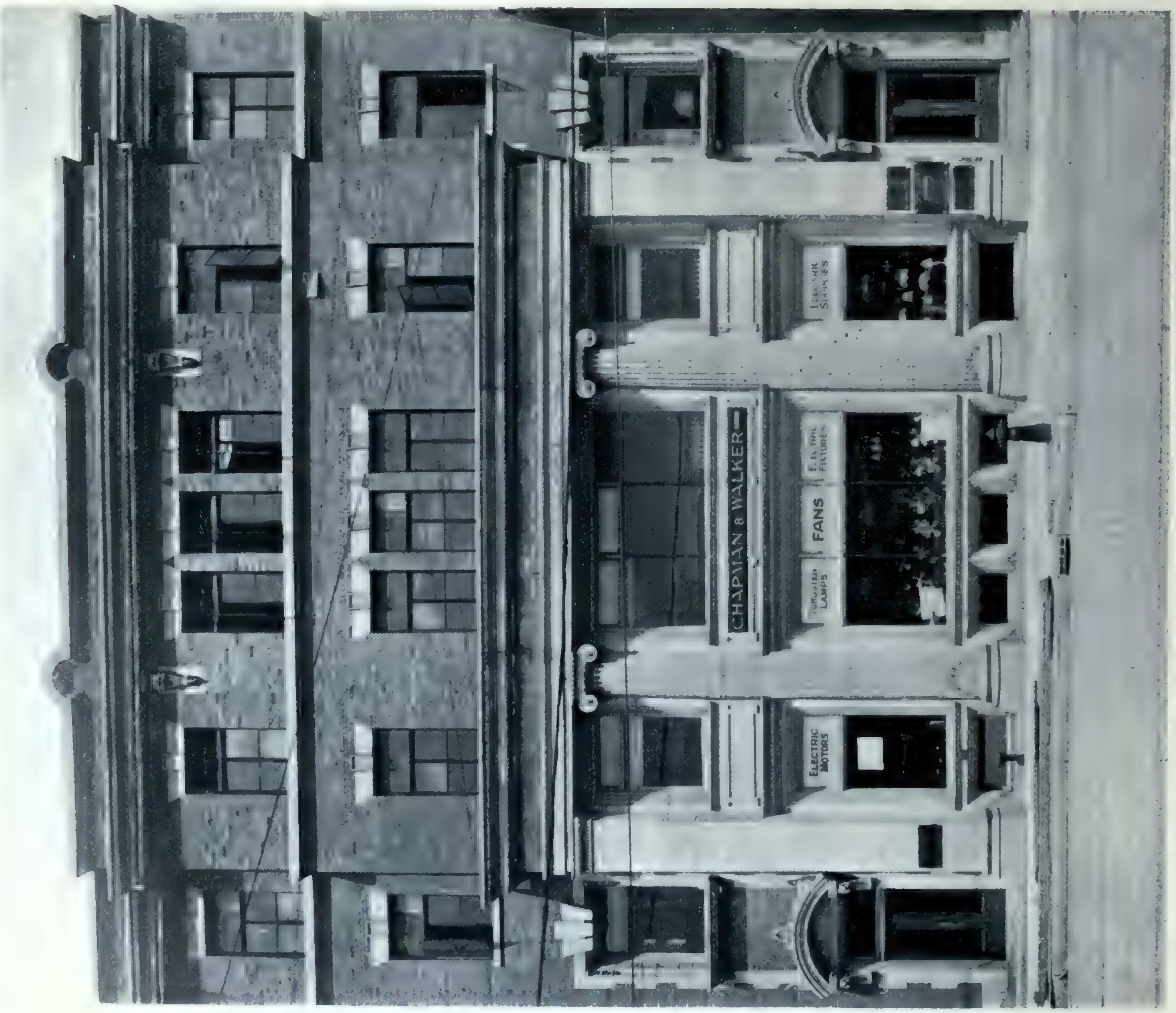


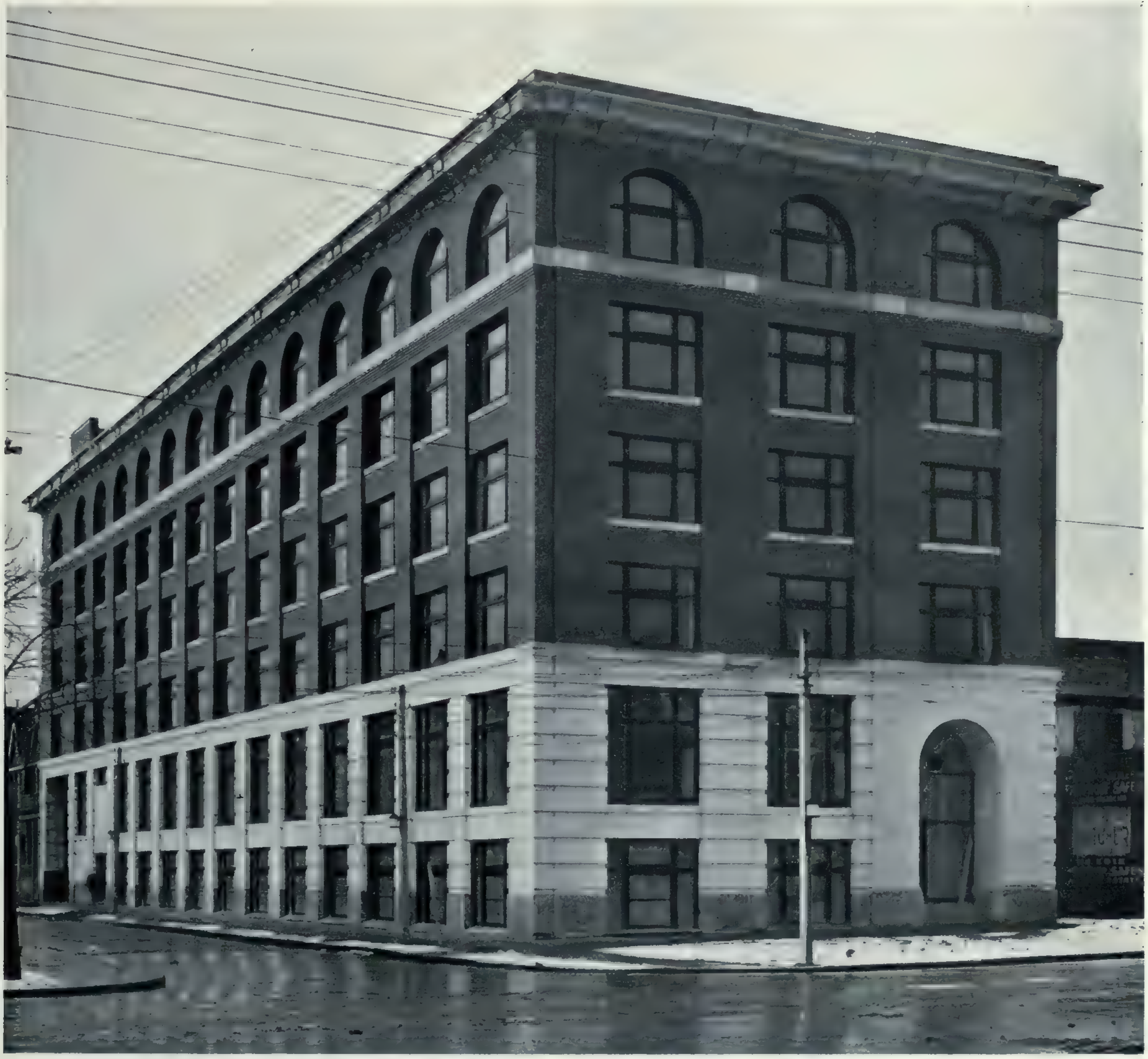


GROUND FLOOR.

CHAPMAN & WALKER
BUILDING.
TORONTO, ONT.

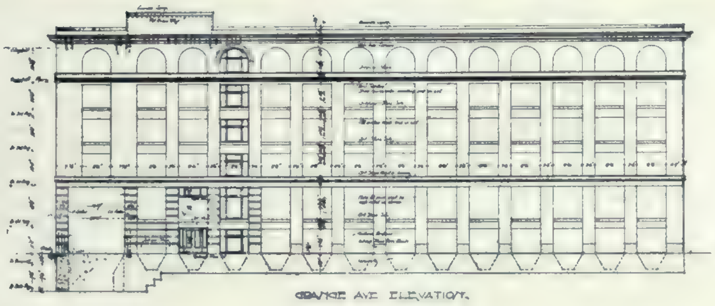
CHADWICK & BECKETT,
ARCHITECTS.



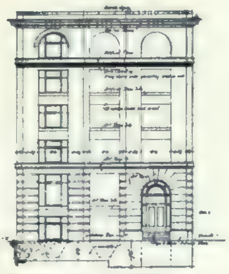


COOPER CAP COMPANY
BUILDING,
TORONTO, ONT.

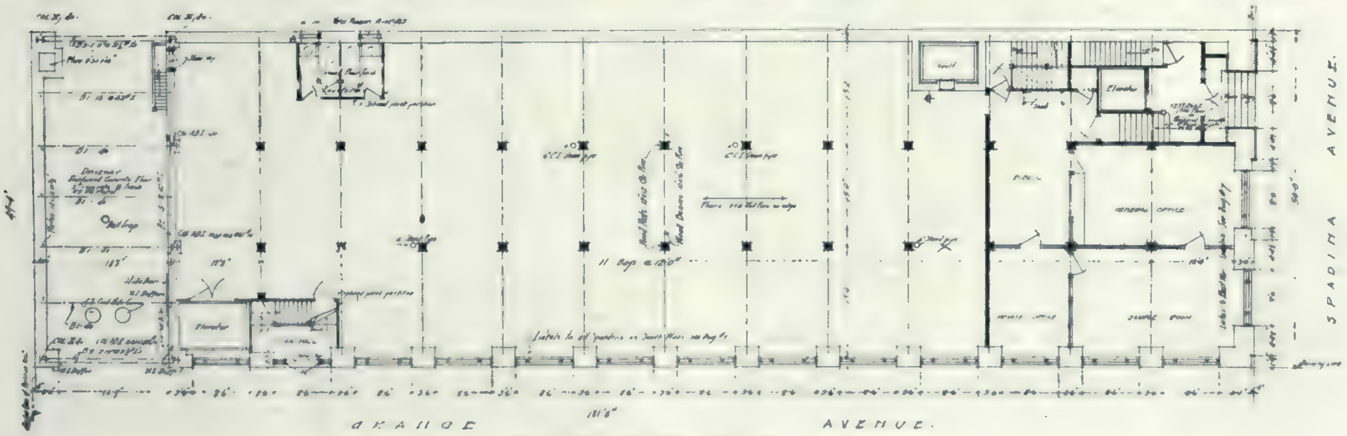
I. FELDMAN,
ARCHITECT.



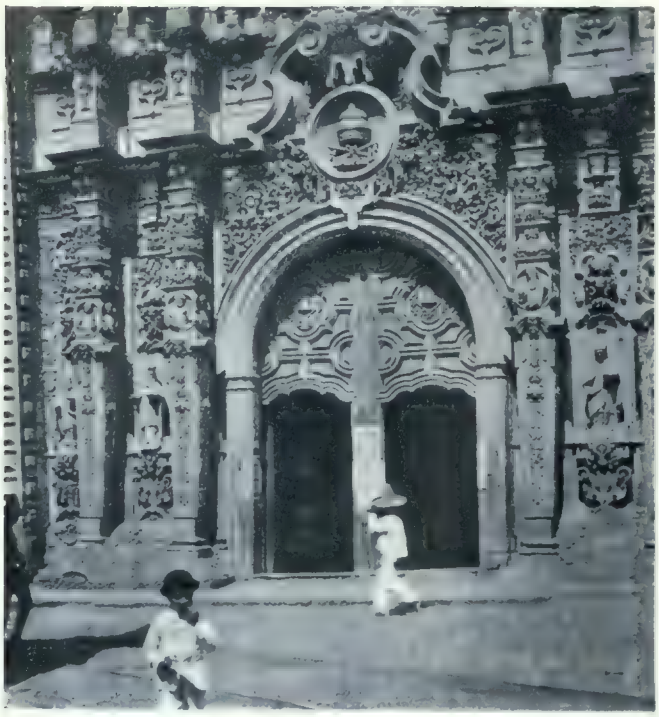
ORANGE AVE. ELEVATION.

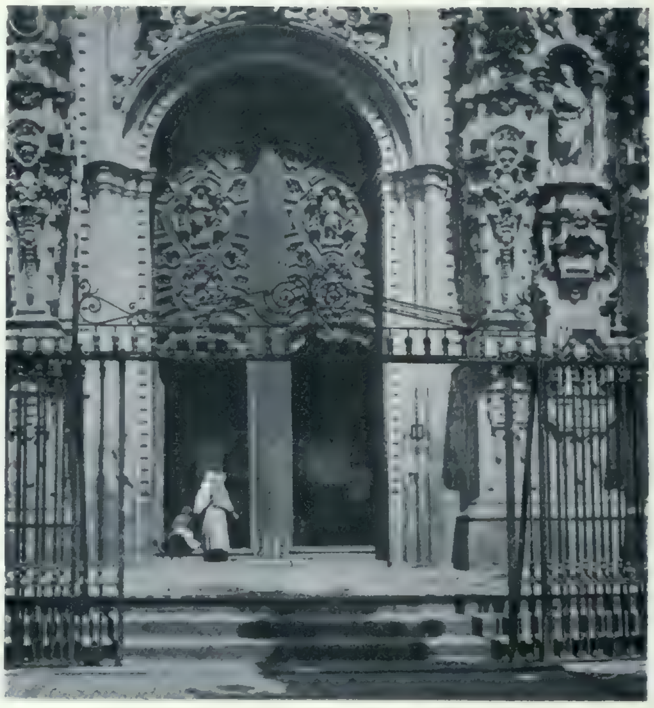


SPADINA AVE. ELEVATION

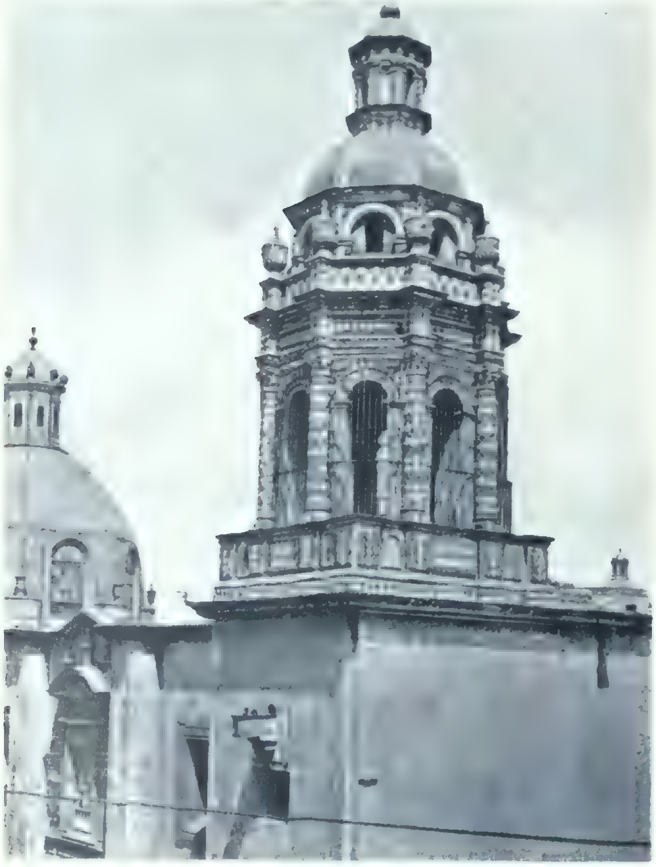


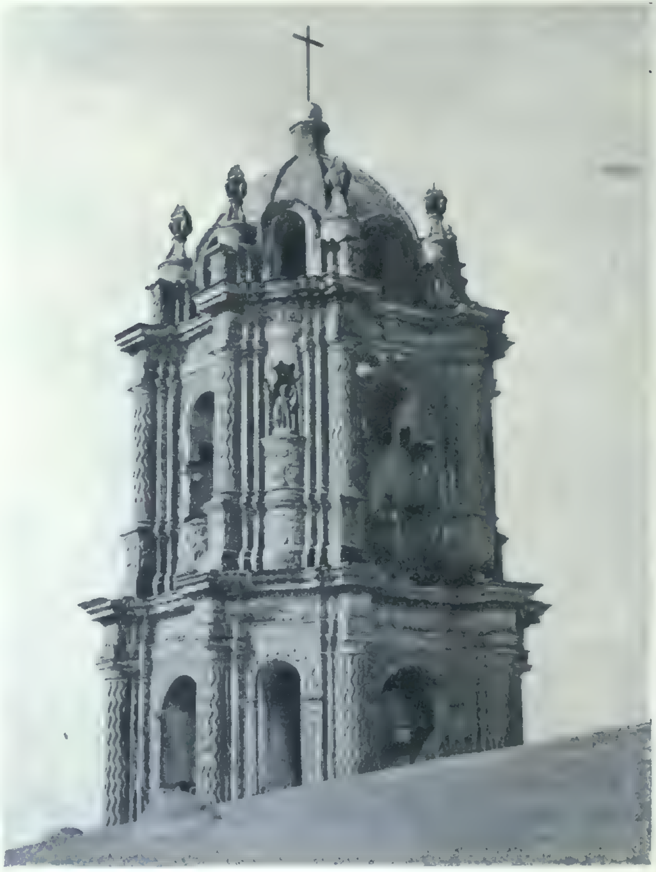
GROUND FLOOR PLAN.





DETAILS OF ARCHITECTURE
ILLUSTRATING ARTICLE
ON MEXICO
BY
F. R. MAJOR.





Mexico of Yesterday and Today

F. R. MAJOR

"FROM what I have seen and heard concerning the similarity between this country and Spain, its fertility, its extent, its climate, and in many other features of it, it seems to me that the most suitable name for this country would be New Spain." Thus wrote Cortez, the Spanish conqueror of the Aztec empire. He also wrote of its teeming markets twice as large as the one in Salamanca, surrounded by arcades and the great temple of which no human tongue could adequately describe its greatness and beauty, the principal tower being higher than Giralda in Seville. From the early part of the sixteenth century until Hidalgo, in 1810, raised the first cry for freedom, Mexico was drained of its wealth by Spanish rulers. In 1825 Mexico became free to work out her own salvation, and for some fifty years she endured internal strife, emerging under the constructive work of Porfirio Diaz. During the reign of this great man the population increased from nine to nineteen million; the railways from four hundred to fifteen thousand; the unwieldy tribes into a united people and vast commercial enterprises. While such prodigious results seem to have met a reverse in the present internal struggle, still it is only a natural result of a young nation and will eventually terminate in a solidarity of spirit and feeling that will bring about a brighter and more glorious progress than experienced under the potent personality of Diaz.

STONE SAILS.

Characteristic of all Spanish nations, Mexico takes your thoughts back to the mother country. The life—manana—the religion, the art, all are indicative of the traits of the people who discovered America and who at one time ruled the civilized world and a large portion of this continent. The church, the barracks and the Government house form the square from which radiates all other life. The houses themselves look as if they sprung from the plans of Spanish builders; the interior patio with gallery over wide entrance and grilled windows. The Government furnishes free to the people serenatas, for everybody is fond of music. Promenading round the public square, the citizens enjoy life in the free and easy way so natural to Latin races. In some cities two promenades are provided, one for the elite, the other for the Indian class, and each enjoy their own wholly indifferent to the presence of others.

Two ways are open to the Mexican traveller. one across the arid plateau of the north, with its scattered cities replete with interest; the other by way of the Gulf of Mexico to Vera Cruz, a city of beauty as beheld from the water, towering above Ulna, the last stronghold of Spain. By taking the latter route it is necessary to pass through the intervening plains and mountains until we reach the Great Plateau, upon which is found the famous Valley of Mexico and its famous capital. First we find a region of perpetual summer with its tropical trees, fruits and flowers, rivers and lagoons all enriched by the birds of variegated colors. From this hot and malarious country we wind among the awe-inspiring rock formations until we reach a different country on the summit above.

The City of Mexico is not only beautiful in her natural environment when viewed from afar, but is an exceptionally attractive city from within. The image of a primitive state is soon dispelled through the architectural merits of her public buildings as well as the extent and character of her boulevards and parks. Built over the ruins of Fenochtitlan, pride of the Aztecs, she has maintained her Spanish feeling, the principal streets lined with shops, churches located in every part of the city—one hundred and twenty—picturesque facades to the house with patios and fountains within. The great cathedral is four hundred feet long with the main facade finished in the beginning of the nineteenth century and composed of the Doric, Ionic and Corinthian orders, upon the interior are twenty large Doric columns, while the walls are covered with old pictures, one being a Murillo and one a Velasquez. The building stands as solid as ever, although suffering from earthquakes and built upon soft soil which has affected other buildings. The Paseo de la Reforma, when the military band is playing and the display of fashions is opportune, presents a wonderful study with its smooth roads, trees and magnificent vista terminating in the heights of Chapultepec. Here stands the equestrian statue of Carlos IV, weighing twenty-two and one-half tons, by Manuel Tolsa. Another statue of greater fame commemorates the heroic defence offered by Cuauhtemoc in 1521. Above two fine bas-reliefs are the names of Indian patriots surmounted by a bronze Indian with spear uplifted.

Some interesting engineering problems have been worked out in Mexico, as will be seen in the following description: "The position of the city of Mexico near Lake Texcoco, which receives the waters of all the other lakes of the system, has ever rendered it liable to inundation, and to a saturated and unhealthy subsoil, conditions which, were it not for the healthy atmosphere of the bracing uplands whereon the valley is situated, would surely make for a high death rate. The drainage and control of the waters of the valley have formed matters of thought for Mexico's successive Governments for more than four centuries. Work to this end was begun under Montezuma in 1449. During the colonial regime further works were undertaken, in 1553 to replace those destroyed by Cortes, followed by other works in 1604 and 1708. But only after the Republican regime was established was the work carried to completion, upon a plan brought forward by a Mexican engineer. These works, which were mainly carried out during the closing years of last century by English firms of engineers and contractors, consist of a canal and tunnel. The canal is thirty miles long, flowing from the city and bearing its sewage and storm-waters, and taking the overflow from Lake Texcoco; and discharging thence into a tunnel, perforating the rim of the valley, about six and a half miles long. This in turn empties into a discharge conduit and a ravine, and the waters, after having served for purposes of irrigation and for actuating a hydro-electric station, fall into an affluent of the Panuco River and so into

the Gulf of Mexico. This work, which is the climax of the attempts of four hundred years or more, reflects much credit upon its constructors and upon the Government of Diaz, which financed it at a total cost of sixteen million Mexican dollars.

How often a country and its people are misjudged by the talkative and all important critic who bases his opinions on a few impressions obtained in the principal city of that country. It would be just as ridiculous to judge Mexico by a hasty visit to its capital as it is to hear others tell of French morality and stability when they have only had a superficial touch of Parisian life. No, the only way to appreciate a people is to visit the various cities, travel through the rural sections and learn to know the classes which form the backbone of any nation. The traits and customs of the people change in ratio to the diversity of climate and to elevation of the country. In many places we may journey in a few hours from the tropical lowlands to the regions of pine and oak, and the cold and cloudy climate of the high mining districts. There is the tropical regions around Vera Cruz, where palms shelter the adobe houses enriched in turn by flowers of all colors. Between here and the capital city we have deep gorges and hills covered with cactæ, hibiscus, oleander, gardenias, etc. Then there is the great plateau extending from the north and tapering southward until it terminates in the valley of Mexico, encircled by volcanic hills. Leaving the great plateau on the west, we descend rapidly and the bitter cold of the uplands soon gives way to the vegetation of the torrid zone. To the south, in the State of Guerrero, the country is rugged and wild, a region alive with interest to the archæologist, the botanist, the ethnologist and the sportsman. As one author puts it, "Away from the main route of travel lie sequestered old sugar estates, and villages of romantic and picturesque charm, yet untouched by speculator or capitalist. Antique piles of stone buildings are there, redolent of that peculiar poetry of the pastoral life of Mexico in the tropics. The old Spaniards built well; their solid masonry defies the centuries; and their most prosaic structures were invested with an architectural charm which the rapid money-seeker of to-day cares little for, in his corrugated iron and temporary materialism. Near to the arches, columns and turrets of the old haciendas the garden lies, replete with strange fruits and flowers."

Morelia, situated to the west of Mexico City, lies upon a hill reached by gradual slopes and known for its many plazas and perfection of landscape gardening. Among the churches is the cathedral, with its decorative towers and graceful outlines, surrounded by trees and open space, and the Las Monjas, which forms an interesting grouping with the girls' college on one side and the barracks on the other. The short trip from here to Patzcuaro extends through rolling prairies and high mountains, from which place it is easy to reach Tzintzuntgan with its old church tower showing above the olive trees and its attractive ruins of old palaces.

Queretaro, of unusual historical interest, is about six hours' run from Mexico City, cleanly and picturesque, with a height of six thousand feet. Her churches are unusual and she is equipped with a hospital, orphanage, five schools, state college, etc. The Church of Santa Rosa has an Oriental feeling with tower, dome and quaint flying-buttresses. Upon the interior the gold and green ornamented side altars are by Tres Guerras; the sacristy has a large painting depicting the old convent garden and the nuns among the flowers. Here also is the famous patio of the Federal Palace with its fountain, corridors of rose-colored local stone, tastily carved. In the Plaza de la Independencia is a finely carved statue by Guillen of the Marques in noble proportions and life-like pose. In mentioning the aqueduct of Queretaro it is best described in "The Man Who Likes Mexico": "Another example of wonderful building is the great aqueduct which brings an abundance of crystal-clear water to Queretaro. First you must see it by day. Note its seventy-two arches, the centre one more than sixty feet in the clear, and its great length of over six hundred meters. Then go again at moonrise. The arches cast their long shadows across the quiet valley and the ruined hacienda lies white and silent in the moonlight. Aqueducts lend a certain stateliness to a city, like that given a mansion by a long approach between rows of trees. They are monuments to courage, skill and untiring labor and they confer on the city to which they pay tribute, all the dignity that these terms convey. Queretaro owes her aqueduct to her noble benefactor, the Marquis de la Villa del Villar del Aquila, who gave $88,000 from his private purse. The total cost of construction was something over $131,000. It was begun in 1726 and completed nine years later."

Guanajuato, a short distance from Queretaro, is most picturesquely

situated in a canyon of the Sierra of Santa Rosa, and on the sides of its steep hills. The streets are extremely narrow and form a maze hard to unravel. In addition to a number of tasty architectural residences; a fine city park; the historic palace of the Granaditas, costing over two hundred thousand dollars, there is the Juarez theatre. This building is constructed of local stone in three shades—gray, rose and light green—which form a perfect symphony in connection with the bronze ornament and figures. Upon the interior the walls and ceiling are a mass of colored ornament, the hangings of crimson velvet and gold. In planning this theatre arrangements were made to run the baggage street cars underneath the stage. The entire cost was $800,000, of which the furnishings for the foyer alone amounted to $30,000. The houses are built of a local freestone which is easily worked and hardens by weathering.

Scattered throughout the mining regions are many ancient and ruined churches. In many cases the miner was not content to build his memorials above ground, but erected chapels and images in the caverns where he worked. An excellent example of an underground shrine is at Guanajuato, where two hundred candles light up the gloomy depths. Obregon, however, built the fine Church of Valenciana in this city at a cost of one million dollars in return for his great strike in the mine bearing the same name. Here also the Marquis of Sardaneta erected the buildings

of the Rayas mine with features of flying buttresses, massive walls, and sculptured portals. Instead of rough props for sheds he used arches, pillars and walls of solid stone, cut and carved with sculptured images above the entrances.

From Queretaro it is a delightful trip to Guadalajura, "the home of the friendly," in the State of Jalisco, bordering the Pacific Ocean. It is a city where the citizens spend their evenings mostly out of doors or else have the homes wide open for the nights are warm. The band furnishes music in the evenings on the Plaza de Arms, which is quite similar to the breathing spots of other cities. Facing the plaza is the cathedral with its pointed towers and the Governor's palace, a fitting background to the palm garden whose benches are shaded with orange trees. This city has over 100,000 population and is well known for its large number of artistic buildings, public monuments and religious institutions.

The ride from Mexico City to Puebla, the "City of the Angels," is fascinating with the ever changing scenery and scent of flowers and pine timber. The freedom and cleanliness of the city impresses one while the various points of interest are unusually attractive. In commenting on Puebla, Mr. Gillpatrick says he did not appreciate the cathedral at first, but to use his own words: "I ended by enjoying Puebla's cathedral. The rains had washed the marble figures of the saints snow-white, and made the gray building-stone more sombre. I place a great deal of importance on color in buildings and their surroundings. In this connection I fancy cloudy skies and dull gray days suit this cathedral better than the golden light and the bright blue heavens that seem the fitting environment for Morelia's. I never realized until now how I had unconsciously allowed these great churches to make for me the atmosphere of their respective cities. Mexico's cathedral is big, massive, commanding, generous and spreading, rather than towering in its proportions. That of Morelia has something fairylike about it; its romantic beauty seems to dominate the half tropical city, with its silent houses, sleeping gardens, and air of mysterious repose. Puebla's cathedral is cold, severe, magnificent. It towers to heaven. While Mexico's cathedral bells make a deafening tumult, cheery withal, and Morelia's bells are silver chimes, the bells of Puebla's great temple are deep-toned, solemn, austere. The city itself is dignified. The people have an air of quiet composure and there is little evidence of frivolity." Here also are to be seen the exceptionally rich tapestries given by Carlos V of Spain, which adorn the sacristy of the cathedral.

The hospital of Puebla is an enormous and very splendid structure, filling the whole of one square. The entrance is adorned with a row of superb columns, and the front of the central or main portion is entirely of red, yellow and black bricks, disposed in an agreeable design and making a fine color effect. The other edifice of first importance is the Palacio Municipal, an elaborate structure of gray stone, fronting on the plaza. Puebla's houses are famous for their tiles, which give a picturesque variety of color, peculiar to this city alone. Often the fronts are of bright glazed tiles, with overhanging cornices of stone, elaborately carved and pointed. You get the impression that the old residents were magnificent in their tastes; though such profuseness of ornament in building could only have prevailed where labor cost little. Many of the houses, where not of tiles, are painted in delicate colors. I saw one which was a fine old rose, with its wide, richly carved cornice and balconies painted white. The balconies were filled with geraniums, which made a blaze of color.

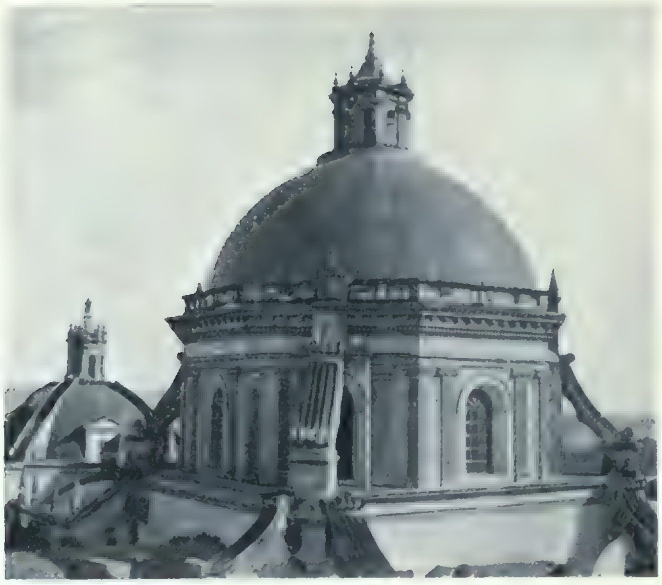
Two monuments of merit are found in Puebla; one a plain gray stone shaft with the bronze figure of Nicolas Bravo and an angel of victory about to crown him with laurel; the other is a marble shaft with bronze figures clustering about it. Near to Puebla is the pyramid of Cholula, on which is built the graceful Church of Nuestra Senora de los Remedios.

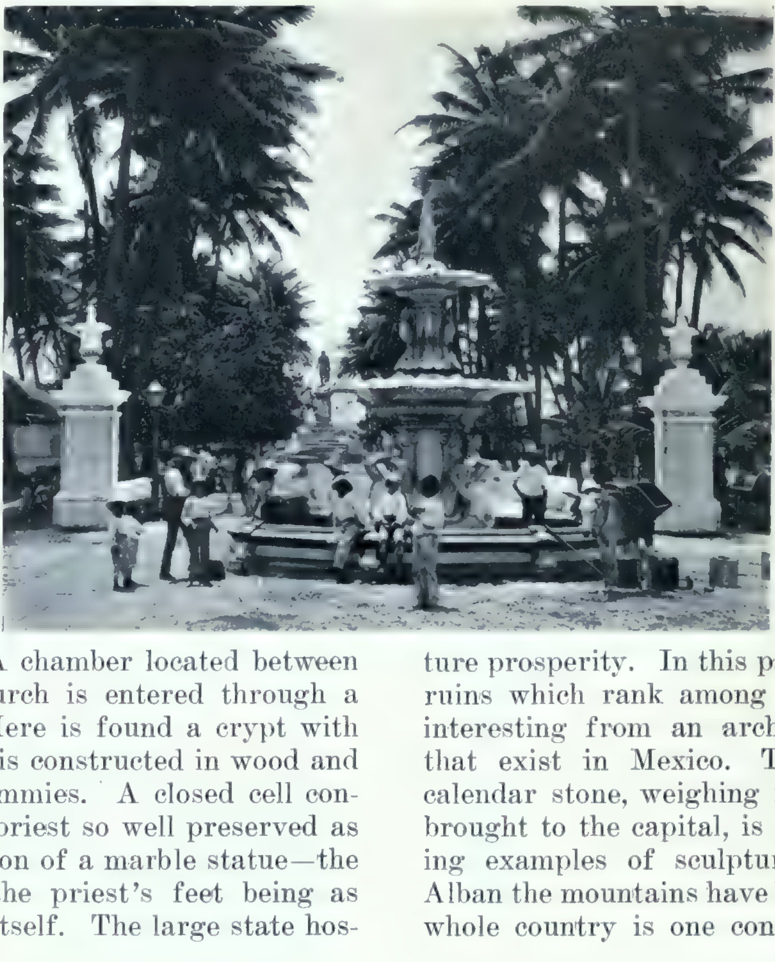
From Puebla to Jalapa is several hours' journey through a level country up to a tableland which descends again through beautiful scenery. The mountains back up the city with her terraced garden plaza and fountains. The homes in Jalapa are mostly low houses of cool shades like light blue, terra-cotta and white; those on the outskirts have walled gardens containing coffee shrubs and banana trees. The cathedral is quite a picturesque structure, as is also the large imposing city market, surrounded by broad corridors, fine arches, and entrances between rows of massive pillars.

At Tlaxcala, midway between Mexico City and Jalapa and just north of Puebla, is an old palace dating from the sixteenth century, revealing some beautiful stone carving about the entrances in which the Spaniards excelled. In the large plaza the parterres were all outlined by borders of black and white pebbles, with ornamental designs containing Grecian and Indian figures. One should visit the museum at Tlaxcala, which contains a large number of old relics most interesting from an architectural standpoint. This city was the site of fierce conflicts in the conquest of Mexico, resisting first and then finally supporting the cause of the Spaniards under Cortez.

From Mexico City to Cuernavaca the train crosses the high ridge of mountains which surrounds the capital, affording a charming view of the city with its churches, trees, etc. The vista on the other side of the mountain is equally as fine. A plain flecked with fields of sugar-cane, encircled with rugged and broken hills, part of which are huge masses of rocks. Cuernavaca is picturesque with its large number of churches, possessing thirteen domes, towers and cupolas. The walls of the houses are washed in colors which afford pleasing effects after years of weathering. Many of the streets have borders of oleander trees, while everywhere are bushes of blue plumbago, tall shrubs, roses and geraniums. An enjoyable side trip is to Tlaltenango, situated amid Italian cypress trees. Here is to be found a quaint church having a campanile and fountain, all forming a delightful rest after the climb all the way from Cuernavaca.

To the north of Queretaro and Quanjuato lie





a series of interesting cities scattered along the great plateau which sprang into existence centuries ago near the mountains which held the silver responsible for their growth. Leaving Guanajuato, the first city is Aguas Calientes, with its great smelting works. Here are located the famous hot springs from which the name of the State and capital came. It is located 6,000 feet above sea level and is both healthy and attractive. To the east is San Luis Potosi, connected to the Port of Tampico by the Mexican Central Railway. The population of this town approximates 70,000 people, who enjoy the life of their artistic city. To the northwest of San Luis Potosi is situated Zacatecas, bearing the coat of arms with the title of "Noble and Loyal." The church of Guadalupe is famous for its architecture and for its paintings. A special charm pervades this Mexican church with her mysterious stairway, dark and silent corridors, and dusty walls hung with ancient paintings. A chamber located between the sacristy and church is entered through a heavy floor door. Here is found a crypt with tombs, one of which is constructed in wood and contains ossified mummies. A closed cell contains the form of a priest so well preserved as to leave the impression of a marble statue—the robes and dog at the priest's feet being as natural as the body itself. The large state hospital of brick and stone in this city is severely plain, with an inside court and fountain.

The city of Durango stands upon a broad barren plain, 6,350 feet above sea level, with a population of 30,000. Durango is one of the foremost of the Spanish-built cities and, like the other places on the plateau, owes its wealth and attractiveness to the gold, silver, iron and copper which is found in large quantities in the mines nearby. The mountain peak of Tcyra, 9,240 feet, affords a magnificent view of the surrounding country and is remarkable for the growth of three zones—bananas growing at the base, pines on the sides and cryptogamous plant life above. Far to the north and in the heart of the vast northern desert is the fine city of Chihuahua. Here amidst the intense heat and cold of the great plain is an excellent example of modern life situated far from other commercial centres. The climate is healthy and the natural resources are a guarantee of its future prosperity. In this part of the country are ruins which rank among the oldest and most interesting from an archæological standpoint that exist in Mexico. The famous Mexican calendar stone, weighing fifty tons, which was brought to the capital, is one of the best existing examples of sculpture work. At Monte Alban the mountains have been cut into until the whole country is one continuous ancient ruin.

Bridge Substructure*

JOHN W. DOTY

THE PURPOSE of this paper is to give a few examples of substructure work constructed by the pneumatic method in Canada during the last few years, and the reason for the adoption of this method in each case. During the past few years the following bridge substructures have been constructed by this method: Two bridges over the Red River at Winnipeg; bridge over the St. Lawrence River near Lachine; bridge over the Harrison River at Harrison Mills, B.C.; bridge over the St. Lawrence River near Quebec; bridge over Mud Luke, near Perth, Ontario.

The pneumatic method has been developed to meet treacherous water and soil conditions, and to insure the founding of a structure on a suitable, properly prepared bottom in the shortest possible time and for the minimum cost considering the conditions encountered. It is naturally the most expensive method of construction, but it is possible to build the structure where all other methods would fail. To emphasize the importance of this method it might be well to classify foundations in general in the order of their relative cost, provided, however, conditions are favorable for the use of the class or type selected—Class 1, spread footings; class 2, piles; class 3, piers constructed by open method; class 4, piers constructed by pneumatic method; class 5, piers constructed by a combination of classes 3 and 4.

Foundations under Class 1, spread footings, are usually placed on the soil a few feet below the ground level. This class of foundation may be subdivided into the following types: Timber grillages, concrete footings, reinforced concrete footings, steel grillages imbedded in concrete.

Foundations under Class 2, pile structures, are generally used where the material at the bottom of the footing is not capable of supporting the load and it becomes necessary to drive piles to some better strata of material in order to obtain a safe support. This class of foundation may be subdivided into the following types: Sand piles, wooden piles, concrete piles moulded in the ground, concrete piles built up, seasoned and then placed; steel tubular piles driven and filled with concrete.

Class 3, piers constructed by open method. These foundations are usually carried a considerable depth below the general ground level to hardpan or rock, and can be subdivided into the following types: Timber sheet pile constructed cofferdam, steel sheet pile constructed cofferdam, timber or steel boxes built up and sunk as excavation is made, timber lined construction, or where the sides of the excavation are lined with timber as the excavation is made; caissons built and filled with concrete before sinking, monolithic concrete caissons which are moulded before sinking.

Class 4, piers constructed by pneumatic method, are usually carried a considerable depth below the ground level to hardpan or rock, but the limit of depth to which this method is practical is 100 feet below water level. This method can be divided into the following types: Caissons built of timber or steel and filled with concrete before sinking, monolithic concrete caissons which are moulded before sinking.

Class 5, piers constructed by a combination of classes 3 and 4. The two last types of class 3 referred to can be readily commenced by the open method and completed by the pneumatic method.

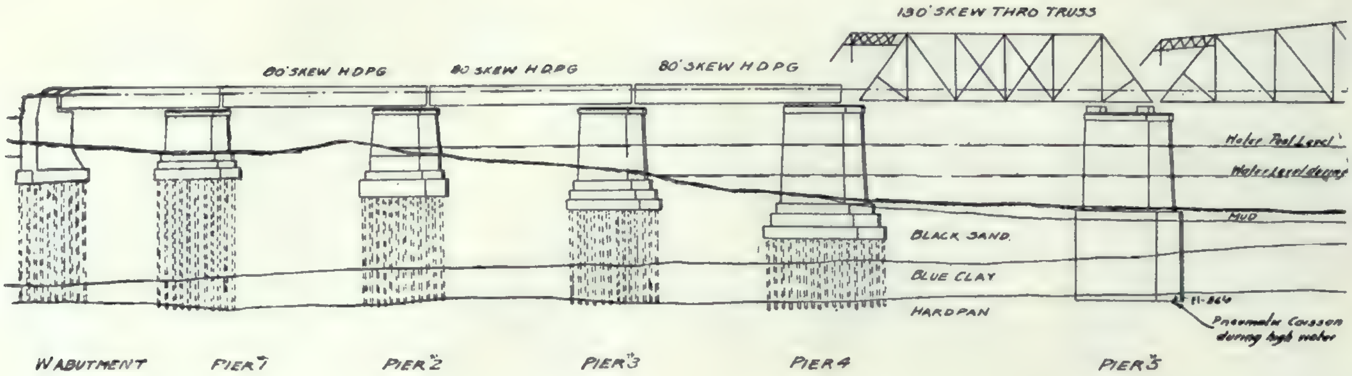
The principal conditions governing the selection of the class and type of any foundation for any particular purpose are as follows: The magnitude and distribution of the loads to be supported; the nature of the soil on the proposed site; the depth to rock or to suitable bearing material below the water level; the elevation of water level; the value of the structure to be supported; the surrounding conditions, such as adjoining structures, etc.; speed of completion; the possibility of the disturbance of the material in which the foundation is resting; the economy of construction. The type of foundation selected for any particular purpose should be the one that safely fulfils all the above conditions and is the cheapest to construct.

The importance of the foundations for structures makes it imperative that the engineer should take a conservative attitude in selecting the type to be used. Time limits the discussion in detail of the advantages and disadvantages of each particular type of foundation. However, it might be well to note the reasons for the failures of some of these types.

Class 1.—Overloading the soil; placing footings on a soil overlying a soil of lesser bearing value; designing eccentric footings and not taking into consideration the maximum pressure due to the load not being evenly distributed; designing reinforced concrete footings on the assumption that the pressure will act uniformly on the soil, no allowance being made for the lack of uniformity of the soil; placing heavy loads on reinforced concrete footings where they are extended below the water level; not carrying footings deep enough to prevent frost action; not

---

*Read before the Canadian Society of Civil Engineers.



NO. 1—RED RIVER BRIDGE NO.

carrying footings deep enough to prevent undermining by scour; not carrying the footing deep enough to provide protection against the material under the footing being disturbed by adjoining construction operations.

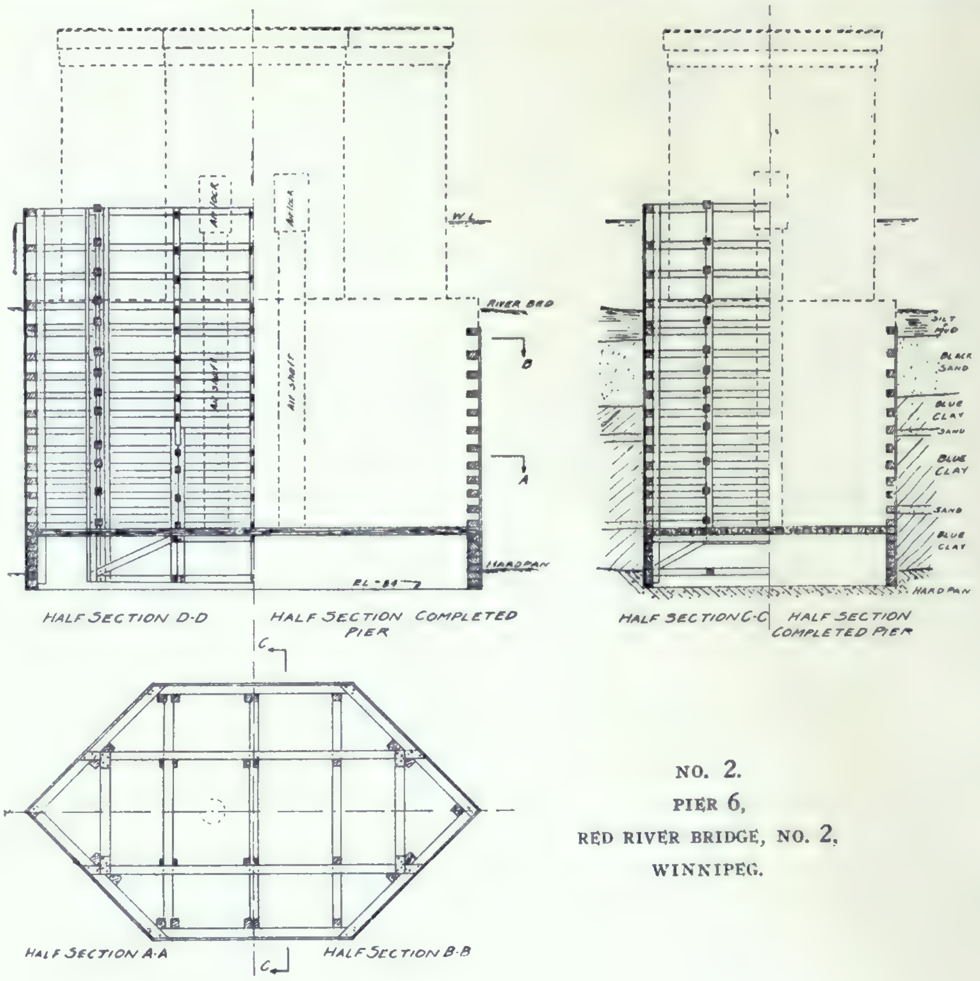
Class 2.—Wooden piles which have not been driven to a firm underlying stratum or driven to a sufficient penetration; wooden piles which are overdriven and broken; where a great many piles are driven at close centres it is, in many cases, impossible to drive all the piles to a firm stratum on account of compressing the upper strata: a readjustment of the soil might take place and permit the structure to settle, as all the piles were not driven to a firm underlying stratum; a steel tubular pile is as a rule overloaded and no allowances made for the reduced bearing value when the exposed steel has deteriorated, also due to the impracticability of founding the bottom of the pipe on a material capable of supporting the usual overload.

Class 3.—Failure of this class usually occurs when the foundations have not been founded on a suitable bottom, due to the impossibility of properly cleaning it off on account of the large quantities of water which are encountered. Failures due not to the completed foundations themselves but to the fact that the method of construction would not prevent the flow of material which will probably cause damage to the adjoining property, especially if the water or soil conditions are treacherous.

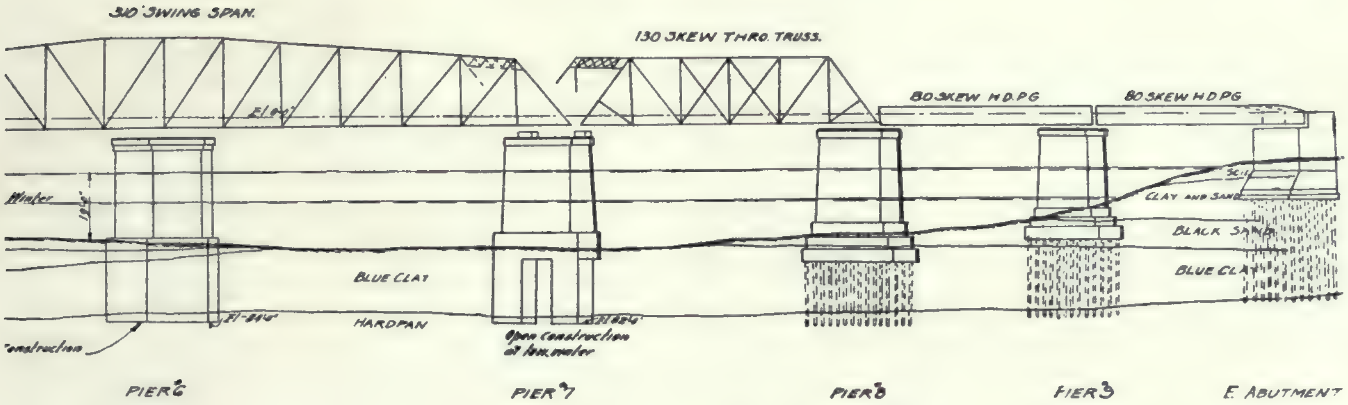
Class 4.—Failure or the impracticability of constructing this type of foundation where large quantities of water are encountered, or the nature of the soil is such that the action of the water on the soil will cause it to flow, making the conditions impossible to reached the assumed bearing elevation.

Class 5.—Failures in this class are due only to poor workmanship or unavoidable accidents, but these, with the present day methods, are very improbable.

From the above data it will be noted that the pneumatic method is classified as the most expensive, but one that overcomes the difficulties in reaching a suitable footing and permits the proper preparation of the bottom on which to found the structure, and the construction below adjoining structures where water and soil conditions are serious, without damage to the ad-



NO. 2.
PIER 6,
RED RIVER BRIDGE, NO. 2,
WINNIPEG.



2 AT WINNIPEG, MAN.

joining structures. The pneumatic method has developed during the last fifty or sixty years with the advent of the heavy and expensive structures. It might be of interest to note that this method is derived from the principles used in the diving bell. This appliance was conceived by the ancient Greeks, developed and used in America for the first time on bridge substructure work about the year 1860, the present method having been worked out during the last fifty years.

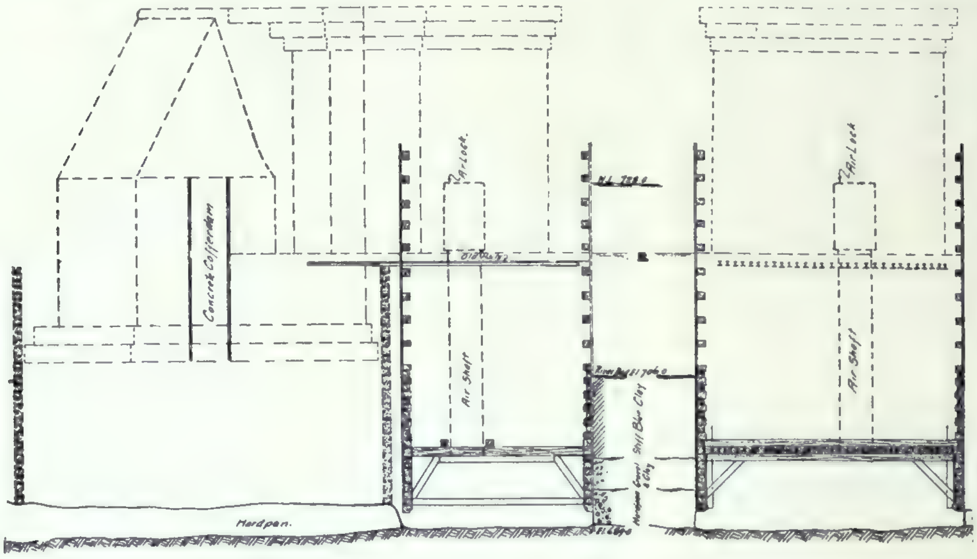
It might be of interest to explain briefly the principles of this method. A pneumatic pier usually consists of three parts, the working chamber, the shaft and the cofferdam. To this structure should be added the equipment necessary to control the air pressure, which is the air shaft, air lock and air supply pipe line. The working chamber can be explained as an inverted box with an open bottom, on which is placed a portion of the concrete shaft, and extending above and around the perimeter of this concrete shaft is the cofferdam. The steel air shafting is built into the concrete shaft and connects the working chamber with the air lock. The working chamber, air shaft and air lock are designed to withstand safely pressures of at least 50 lbs. per square inch, which is the practical limit of the pneumatic method. The air lock consists of a shell with two diaphragm plates to which are suspended two doors. These doors permit the passing of men and materials from the atmospheric pressure to the increased pressure in the working chamber without allowing any appreciable decrease of the higher air pressures in the working chamber. In addition to the equipment on each caisson, it is necessary to operate an air compressor plant. It is not the intention to discuss the detailed design for the construction of the pneumatic caissons nor the equipment, but the above brief outline gives the principle of the method and equipment for operation, and shows the reason for the expense in constructing work by this method.

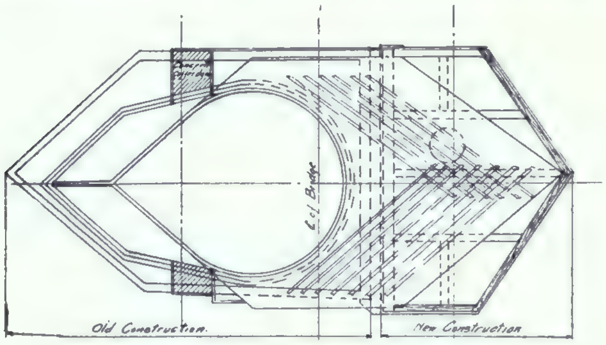
Red River Bridge No. 2.—The first work to be discussed is the construction of the piers for Red River Bridge No. 2, at Winnipeg, Manitoba. Drawing No. 1 gives the elevation of the bridge, showing the depth of water and the depth to rock, also the nature of material on the site overlying the rock. In general, the water in the river is approximately 28 feet in depth, while the rock is about 62 feet below water level. The soil overlying the rock varies from a stiff clay on the east bank to a fine flowing sand on the west bank, and in certain places both of these materials were found in different strata. Generally speaking, the soil in and about Winnipeg flows or is displaced by surcharged load or vibration, and although some clays might be loaded safely on the basis of two tons per square foot, the use of spread footings would be impracticable for a heavy or expensive structure, especially where vibration due to rolling stock would aggravate the conditions. Also on account of the general movement of the soil in this vicinity it is not possible to put a structure of this type on a spread footing at any cost.

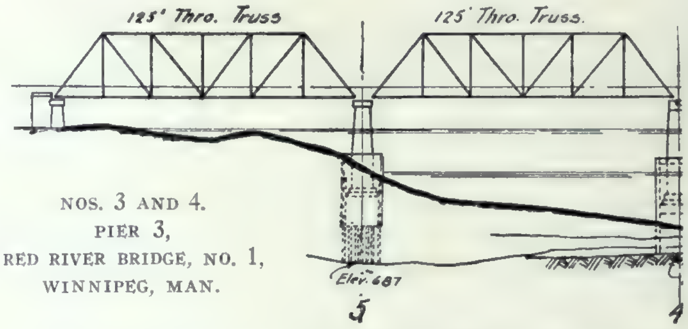
Considering Class 2 or pile type of foundations, these were adopted for the two abutments and piers 2, 3, 4, 8 and 9, which supported the flanking or fixed spans; but on account of the nature of the material and the general movement which has been referred to, it was deemed inadvisable to use this type on piers 5, 6 and 7, which support the drawspan, and would cause trouble and inconvenience if any settlement or movement took place, whereas on the flanking piers a slight movement or settlement would not seriously affect the structure. For this reason it was decided to carry piers 5, 6 and 7 to hardpan or rock, which borings indicated would be encountered at a depth of 65 feet below water level eliminating Classes 1 and 2.

Class 3, dredging types, were considered inadvisable on account of the stiff clay and sand strata which were encountered at the site of these piers. Stiff clay is a material which cannot be economically excavated from the inside of a box through any great depth of water. It was inadvisable to use the open cofferdam type and excavate in the open, on account of the numerous water bearing sand strata which were encountered at depths which were not economical for unwatering. Also because of the necessity of founding the piers on a uniformly hard bottom in the hardpan and at such depths below water level, it was impracticable to pump out the cofferdam in order to make this excavation in the open, and dredging this nature of material through the water at such depths is expensive and unreliable.

Another item which had to be taken into consideration was the time allowed to complete this structure. The plans were approved by the Government on December 28th and it was necessary that this structure be completed not later than September 1st, and an open method, if possible, with its numerous contingencies with this depth of water would be uncertain and date of completion not positive.







NOS. 3 AND 4.
PIER 3,
RED RIVER BRIDGE, NO. 1,
WINNIPEG, MAN.

In conclusion, the reason for the adoption of the pneumatic method on this work was: The loads to be supported; the vibrating load to be supported; the elimination of any possible settlement or movement which might interfere with the operation of the drawspan, necessitating the pier being founded on good uniform hardpan or rock; the impracticability of dredging or excavating the clays to hardpan through the water by any economical method; the impracticability of unwatering; the speed necessary in order to insure completion.

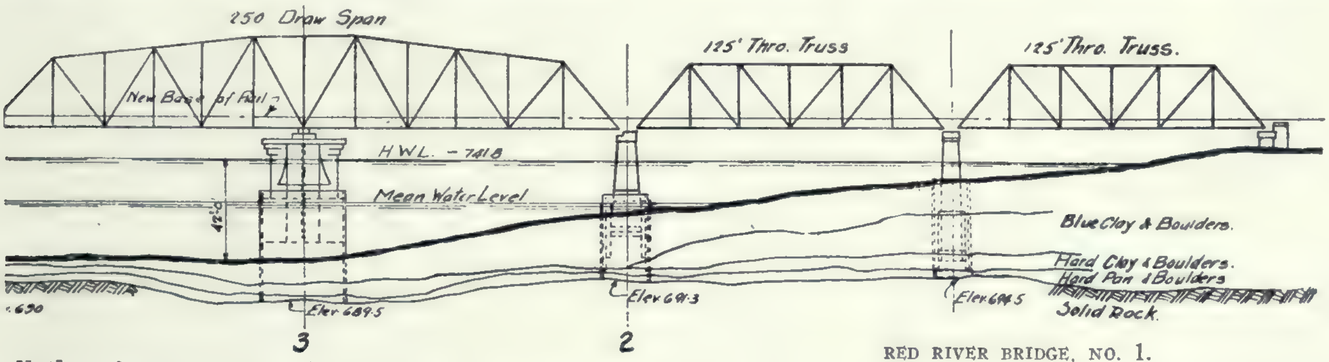
Pier No. 6, sheet No. 2, was the largest and last pier constructed. The working chamber was built on the shore and placed on the site on the 25th of June, 1913. It was bottomed by the 19th of August. This pier, which contained 3,192 cubic yards of concrete, was completed in fifty-five days from the date the caisson was placed on the site. The total substructure was completed by August 28th, or within eight months' time. Pier No. 5 was constructed by the pneumatic method at high water period. Pier No. 7 was constructed by open method at low water period. It required twice the length of time as pier No. 5 and was considerably more expensive.

Red River Bridge No. 1.—Drawing No. 3 shows the elevation of this bridge, the depth of water, the distance to rock, and the nature of material on the site overlying the rock. This structure is within three miles of the bridge known as Red River Bridge No. 2, and the general conditions are similar, except that the clay does not contain layers of sand as at the site of Red River Bridge No. 2.

The work consisted of extending the piers of the old bridge for the purpose of double tracking. The old piers were constructed by the dredging method some years ago, and the substructure required approximately two years to complete. The old piers were all carried to hardpan by the open dredging method, except pier No. 5, which was founded on piles. The reason for founding this pier on piles was on account of the impracticability of carrying the same to hardpan or rock by the open method because of the material flowing into the caisson as the excavation was being made, and the impossibility of making progress in excavation sufficient to overcome the inflow. The extension to piers Nos. 1 and 2 was built by the wooden sheet pile method (Class 3), which was practical on account of the stiffness and pervious nature of the clay. The extension to pier No. 5 was founded on piles. The excavations were made to the elevation of the old foting by the use of the steel sheet pile cofferdams. Old piers 3 and 4 were founded on hardpan by an open dredging method and the concrete deposited through the water.

The probability was that some slight settlement had taken place during the past years, but had come to rest, and the only safe manner of insuring against even a slight settlement of the new portion of the piers when combined with the old was to carry the new portion of the piers to rock. This necessitated excavating several feet below the footings of the old piers, and to make this excavation economically, considering both the nature of the material and the absolute necessity of not disturbing the hardpan under the old portion of the pier, the pneumatic method was used. Sheet No. 4 shows the manner of extending the centre pier No. 3. As stated above, it required about two years to complete the substructure of the first portion of the bridge, whereas the extension of the piers had to be completed in less than seven months. The contract for this work was awarded in February, and the construction was all completed by August.

In reference to the use of the pneumatic method on the double tracking of the St. Lawrence River Bridge, this plan and method was used for the extension of the piers. The conditions existing and the means of overcoming the difficulties were similar to those found and overcome on the Red River Bridge No. 1. A number of the old piers of this bridge were founded on rock, but a great many were resting on hardpan, and to eliminate any possible splitting of the piers when the old piers and the extension were bonded together, the extensions of all the piers were carried to rock. In one case it was necessary to carry them to a depth of 9 feet below the footing of the old pier. The greatest depth of water was 42 feet.

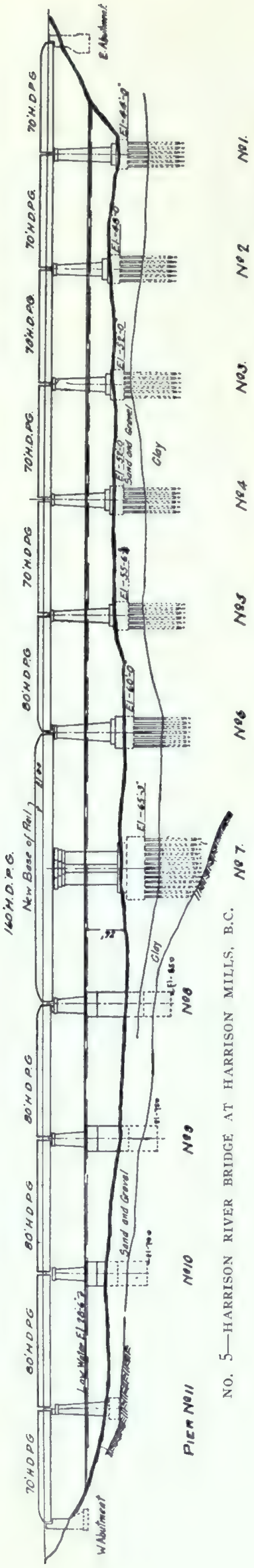


RED RIVER BRIDGE, NO. 1.

Harrison Mills Bridge.—This work is now under construction over the Harrison River, at Harrison Mills, B.C. Drawing No. 5 gives the elevation of the proposed structure, the depth of water to rock, and the nature of soil overlying the rock. The soil being principally sand and gravel, with a little clay on the east portion of the bridge, it was deemed practical to build the eastern half of the bridge on wooden pile foundations, and the western portion of the bridge on rock by the use of the open caisson method on account of the shallow depth of the rock. Additional borings made on the site after the work was begun showed that the rock on the western portion of the bridge sloped at an angle of from 30 to 40 degrees.

On pier No. 8, sheet No. 6, the depth of water was approximately 25 feet, the depth to rock on the downstream side of the pier was 30 feet, and the depth to rock on the upstream end of the pier was 55 feet. The soil overlying the rock was principally sand and gravel with traces of clay. It was necessary to carry the footing of the pier into the river bottom at least 8 feet to protect the pier against scour. This depth would bring the downstream end of the pier on rock, whereas the upstream end would be approximately 25 feet from rock. It was not practical to use a spread footing class of foundation as one end of the pier would be resting on rock and the other end on sand, gravel and clay, which would no doubt settle and cause it to slip out of line. It was also not practical to consider the use of piles on account of the short length of these at the downstream end of the pier. It was also not possible to construct an open dredging caisson in one mass at the site of this pier, because of the steep slope of the rock and the large expense to be incurred if the rock was excavated sufficiently to enable the caisson to be carried to a uniform rock level. For these reasons it was finally decided to found the pier on rock, using either an open method or pneumatic caisson on the downstream or shallow end and a pneumatic caisson, on account of the depth of the water, on the upstream end of the pier, the rock being stepped off in the working chamber so as to prevent sliding. It was also decided that the concrete shaft of the pier should be built on these two independent caissons, the shaft to extend to a depth of approximately six feet below low water to the coping, the whole design being reinforced so as to combine the two caissons, and the shaft to take up all strains to which this type of pier would naturally be subjected. This design and method of construction is used on piers 8, 9 and 10.

The Quebec Bridge.—On account of the magnitude of this structure it was necessary to found the piers on a stratum which would absolutely preclude the possibility of settlement, and to carry the footings to such a depth as to eliminate any possibility of scour.

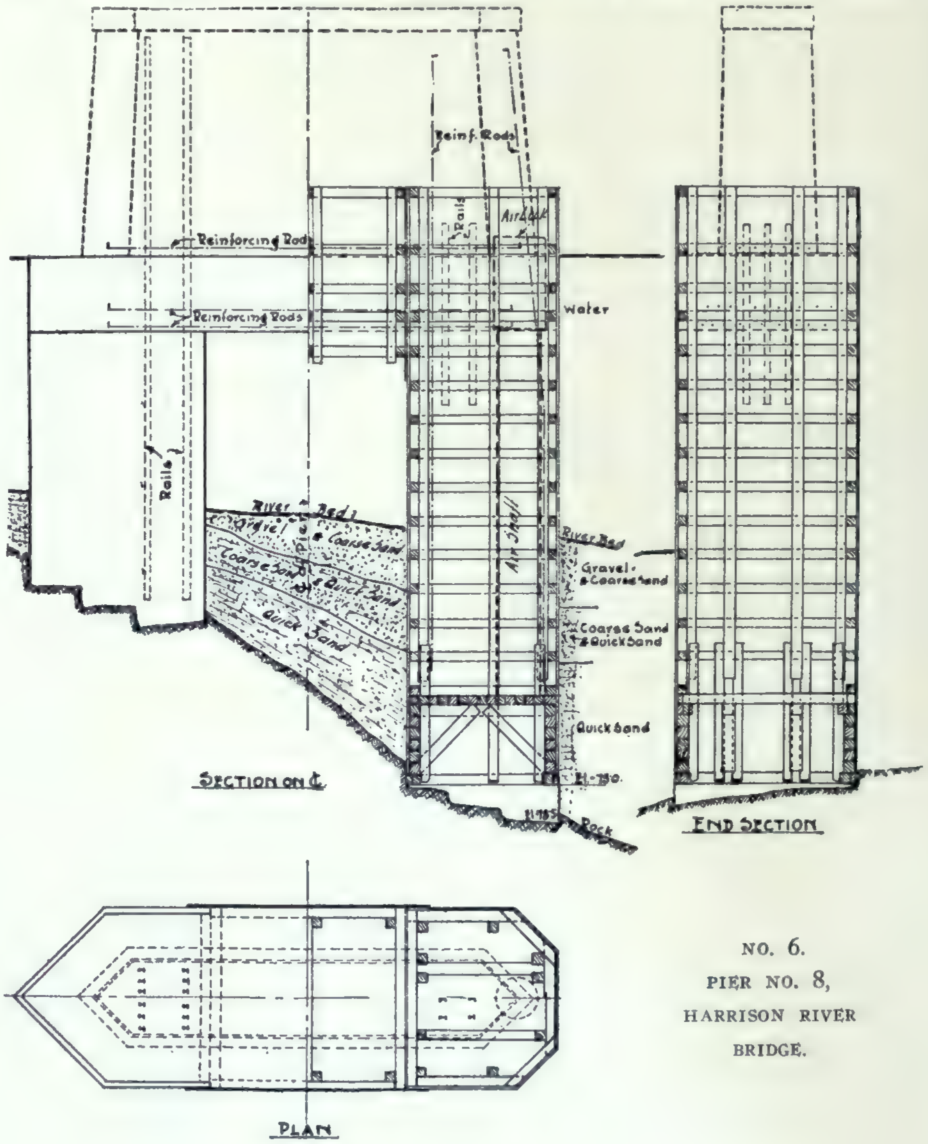


NO. 5—HARRISON RIVER BRIDGE AT HARRISON MILLS, B.C.

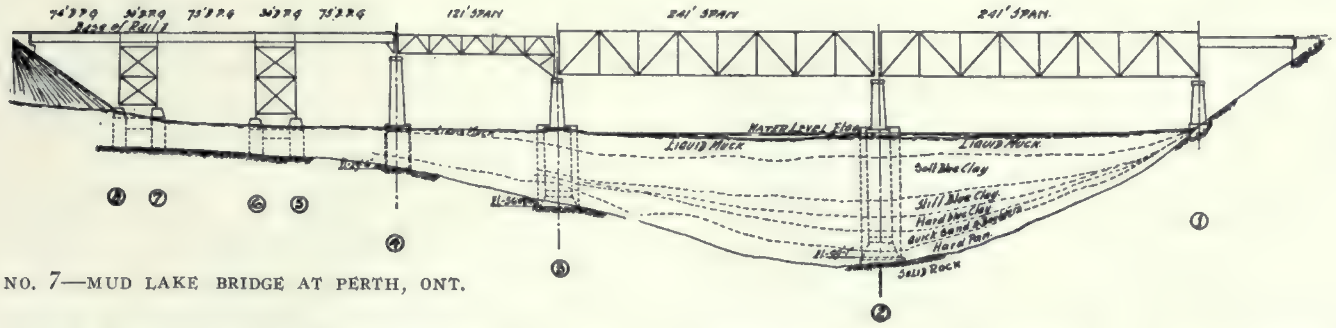
The nature of the material on the south pier was such that pneumatic caissons could be founded on rock at an elevation of approximately 85 ft. below the water level, and it was necessary to use this method in order to excavate to rock and properly prepare the rock surface. The north pier was founded on hardpan at a depth of approximately 60 feet below the water level. It was necessary in either case, in order to reach the stratum on which the piers were founded, to do the work by the pneumatic method as it was impracticable to remove the large boulders and other material by any dredging method, and when the hardpan or rock was reached, this bottom had to be prepared in such a manner as to preclude any possibility of settlement.

In the north pier, which did not reach rock, the engineers carried on an exhaustive test on the soil before permitting any concrete to be placed.

Mud Lake Bridge.—Drawing No. 7 gives the elevation of the bridge over Mud Lake, near Perth, Ontario. It also shows the depth of water, the depth to rock and the nature of the material on the site overlying the rock. The conditions on this site are rather unique in many ways. At the site of pier No. 2, sheet No. 8, the water is about 8 feet in depth, but for the next 50 feet the material is a liquid clay. Below this liquid clay is encountered a stratum of stiff clay to a depth of 12 feet, under this is a stratum of boulders, sand and clay, which is very firm and compact and below this stratum, and overlying the rock to a depth of about 10 feet, is a stratum of cemented sand, rock being encountered at the site of this pier at a depth of from 108 to 115 feet. It is quite obvious that a spread footing



NO. 6.
PIER NO. 8,
HARRISON RIVER
BRIDGE.

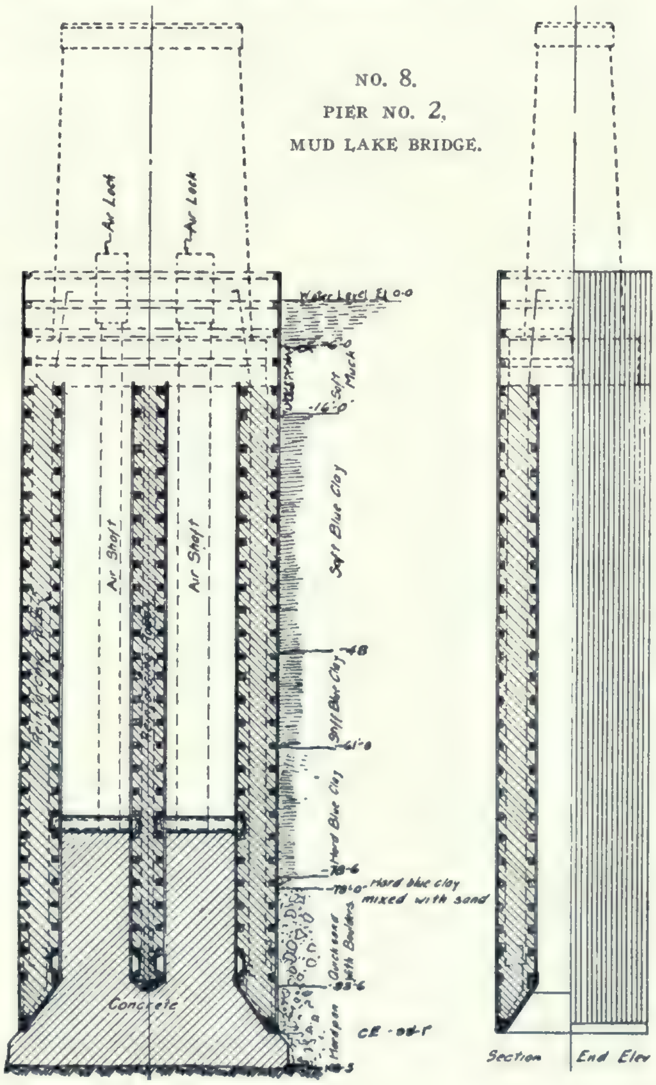


NO. 7—MUD LAKE BRIDGE AT PERTH, ONT.

design foundation would not support the load. A pile type of construction would be inadvisable on account of the great depth of liquid mud which would not give the piles lateral stability, the small amount of penetration which the piles would obtain in the stiffer underlying stratum of clay, and the probability that the piles could only be driven to the stratum of boulders and no further. The constant vibration and the stresses due to traction would so affect the foundation that the lateral stresses could not be resisted by the upper portion of piles in the liquid clay, and the working or slight movement which the vibration would cause in the foundation would soon affect the soil adjoining the piles in the stiff clay stratum and cause it to soften.

In the liquid clay mass encountered on this site there is no assurance that the whole mass is not following some progressive movement, which might be slight, but in years to come might move any structure which did not receive its support from some underlying fixed surface which would preclude the possibility of movement. The pier should be so designed that in case of a movement of this nature it would be strong enough to resist it and to permit the material to flow around it. For this reason it was deemed inadvisable to place the foundations of this structure on any substance other than a material equivalent to hardpan, or, if possible, on rock. An open caisson type could be carried to the stiff clays, but this type is impracticable in stiff clays at this depth on account of the great troubles encountered in dredging and removing it. The boulder stratum below this stiff clay was not deemed of sufficient stability for the support of this pier, and it would not be economical to remove this nature of material by an open dredging method. It was also deemed advisable to carry the pier some distance into the cemented sand, so as to be certain of obtaining a uniformly hard surface before placing concrete. It would be impracticable at this depth to do this by an open method. For these reasons it was finally decided to construct an open dredging pier and carry it into the stiff clay stratum, at which elevation the dredging caisson was converted into a pneumatic caisson and carried through the stiff clay and boulder stratum into the cemented sand until a uniform surface was reached and properly prepared. To add greater stability to the pier the bottom was belled or carried out a distance of 18 inches beyond the perimeter of the caisson, and the whole lower portion concreted to form the base to support the pier. The excavation was carried to a depth of 103 feet 8 inches, which is the deepest bridge pier in Canada, and, with the exception of one, the deepest in America.

In conclusion, it is quite evident that the pneumatic method, although the most expensive one in the general classification of foundations, is the most economical, considering the conditions which were encountered in the above examples, and brings out clearly the certainty of securing a suitable footing beyond any doubt, the speed of completion and the positive manner in which difficulties can be overcome.



NO. 8.
PIER NO. 2,
MUD LAKE BRIDGE.

Engineering Books

Theory and Practice of Surveying.—Recognizing the many and rapid improvements in apparatus as well as in field methods, Leonard S. Smith, C.E., has thoroughly revised and in a large part rewritten J. B. Johnsons book on the Theory and Practice of Surveying. The changes consist of the rearrangement of the subject matter; the omission of certain portions, notably the chapter on Railroad Topography; the use of over one hundred new and additional illustrations of apparatus and methods of its use; the addition of over one hundred pages in re-writing chapters on the Engineer's Level and Transit; Land, Topographic, Hydrographic, City and Geodetic Surveying; the supplying at the end of each chapter of many leading references to the best literature on the subject. The work is divided into three books, the first treating of the adjustment, use and care of all kinds of instruments used in field and office; the second section describing the theory and practice of surveying methods in the various departments mentioned above; the third part discussing the measurement of base lines; the measurement of the angles of the triangulation system; the astronomic determinations of latitude, longitude and azimuth. Published by John Wiley & Sons, New York, at a cost of $4.00.

* * *

Concrete, Plain and Reinforced.—A treatise of the materials, construction and design of concrete and reinforced concrete, written for practising engineers and contractors, as well as a work of reference for engineering students. The auhtors, F. W. Taylor and S. E. Thompson, have consulted specialists in regard to each feature presented and have included chapters written by such authorities as R. Feret, W. B. Fuller, F. P. McKibben and S. B. Newberry. Each phase of cement construction receives proper attention and is thoroughly discussed under the following headings: Definitions; Process; Specifications; Choice and Proportion of Ingredients; Classification of Kinds; Chemistry; Testing; Tables; Mixing; Effects of Sea Water, Freezing, Fire and Rust; Manufacturing Process. Appendix I gives methods of chemically analyzing cement materials; Appendix II presents formulas for reinforced concrete beams compiled by Professor McKibben. Over two hundred pages of new matter have been added to the first addition. The work is published by John Wiley & Sons, New York, and costs $5.00.

* * *

Design of Highway Bridges.—This work furnishes a treatise on the calculation of stresses in bridge trusses and presents a discussion of the details and design of highway bridges. The author, Milo S. Ketchum, C.E., appreciates how little attention has been paid to the design of highway bridges and consequently has laid great stress upon this phase of the problem, treating of the superstructure and substructure. Various materials, such as stone, concrete, and reinforced concrete are taken up, together with the cost, showing their influence upon economic designing. The book is divided into three parts: Stresses in steel bridges; the design of highway bridges; problems in highway bridge details. An appendix treats of the general specifications for steel highway bridges under the general headings of design, loads, unit stresses and proportion of parts, details of design, materials and workmanship. The McGraw-Hill Book Company of New York are the publishers. The cost is $4.00.

* * *

Letters and Lettering.—As stated by the author, Frank Chouteau Brown, this book intends primarily to exhibit the letter shapes and has been arranged to show how the letters compose into words. The application of classic and mediæval letters to modern usages has been, as far as possible, suggested by showing modern designs in which similar forms are employed. The work is divided into five chapters: Roman Capitals; Modern Roman Letters; Gothic Letters; Italic and Script; To the beginner, and includes a large number of illustrated examples. Standard forms of every individual letter in each of the two basic styles, Roman and Gothic, is shown by a diagram with a detailed description of the method for drawing it. The book is published by Bates & Guild Company, Boston, costing $2.00.

* * *

Chambers' Mathematical Tables.—A new edition of these tables has been published by the D. Van Nostrand Company, New York City, consisting of logarithms of numbers from 1 to 108,000. The work comprehends the most important mathematical tables necessary in the sciences of trigonometry, mensuration, land-surveying, navigation, astronomy, geodetic surveying, and are carried to seven decimal places. As accuracy is the most important element in such tables, the greatest care has been bestowed in collating the whole with the best editions of the tables of Taylor, Hutton, Callet, Kohler, Schron and Shortrede. The book is edited by James Bryde, F.E.I.S., and costs $1.75.

* * *

Any or all of the above mentioned books may be secured from Eugene Ditzgen Co., Ltd., 116 Adelaide street West, Toronto, or their Western agents, Strains, Limited, 313 Portage avenue, Winnipeg.

CONSTRUCTION

A · JOURNAL · FOR · THE · ARCHITECTURAL
ENGINEERING · AND · CONTRACTING
INTERESTS · OF · CANADA

FREDERICK REED, Editor

H. GAGNIER, LIMITED, PUBLISHERS
Corner Richmond and Sheppard Streets,
Toronto - - Canada

BRANCH OFFICES:
MONTREAL—171 St. James Street
WINNIPEG, MAN.—13 Royal Bank Building
CHICAGO—People's Gas Building
NEW YORK—156 5th Avenue

CORRESPONDENCE.—All correspondence should be addressed to "CONSTRUCTION," Corner Richmond and Sheppard Streets, Toronto, Canada.

SUBSCRIPTIONS—Canada and Great Britain, $3.00 per annum. United States, the Continent and all Postal Union countries, $4.00 per anum, in advance. Single copies, 35c.

ADVERTISEMENTS—Changes of, or new advertisements must reach the Head Office not later than the twentieth of the month preceding publication, to ensure insertion. Mailing date is on the tenth of each month. Advertising rates on application.

CONTRIBUTIONS—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and duly returned.

Entered as Second Class Matter in the Post Office at Toronto, Canada.

Vol. VII Toronto, April, 1914 No. 4

CURRENT TOPICS

PROFESSOR PARKS, who has recently conducted an extensive investigation into the building stone resources of Ontario, Quebec and the Maritime Provinces, says that building stone, on account of the difficulties of transportation, is one of the few things which remains characteristic of a locality, Toronto, for example, through lack of stone, being a brick city, while Montreal is largely built of limestone. Professor Parks stated that Eastern Canada possesses plenty of sandstones and limestones, but unfortunately the increasing use of concrete is militating against their use. Granite is coming more into use with increased wealth, but, although there is plenty of marble of excellent quality, and the most variegated and beautiful varieties, its use is not increasing as it ought, largely because of the prejudice and lack of knowledge on the part of architects of the resources of the country in this respect. As a result, the lecturer pointed out, architects go to considerable extra expense to import marbles which are no better and often inferior to the native stone. Since the many different quarries throughout the country all possess marbles which differ in some respect from practically all others, Professor Parks predicted a profitable industry in this class of stone as soon as its good qualities become better known.

* * *

DR. GLINZER, Director of the State Building School in Hamburg, says that to make oil paint adhere to cement the surface of the material should be coated with diluted sulphuric acid (1 part concentrated acid to 100 parts of water), which afterwards must be washed off and the surface allowed to dry. Or the surface may be covered with diluted silicate of soda (wasserglas), the solution to be 1 to 3 or 1 to 4, and applied three times in succession. Still another method is to apply two coats of building "fluat" at least 24 hours apart. Practical builders state, however, that the applications of sulphuric acid are not made by them, and that such success as they have results merely from careful work and the use of good materials. Dr. Glinzer also says that oil paint should be applied to cement in the following manner: "The surface is given one coating of linseed-oil varnish, to which is added a first coat of white lead when the varnish is dry. A second coat is then added, also containing white lead, together with more or less coloring matter, as the building laws forbid the use of absolutely white paint on the exterior of structures. In this climate the use of oil paints is recommended, as they are waterproof and present smooth surfaces which attract a minimum of dirt. Painting according to this method costs here about ten cents per square yard. Applied to iron, linseed-oil varnish when used by itself flakes off readily. It should be thoroughly mixed with red oxide of lead, caput mortuum, or other graphite. This mixture serves as a first coat after the perfectly clean and dry surface has been gone over with the ordinary hot linseed-oil varnish. When the dead color has dried, another coat of the color desired is applied. The oil, being partly converted into resin, combines with the coloring material, making a thick coating that is the more impervious to water accordingly as the color is finely ground or not. Lead should be used when the paint is exposed to water. The water colors so frequently used in Germany as a rule have silicate of soda as their base. These colors can be used on cement, plaster of paris brick, or glass. Liquid casein paints are easily worked and are said to be durable. The discoloration of cement buildings results very frequently from the class of cement employed rather than from the color applied afterwards."

WITH THE CORDIAL co-operation and largely at the instance of the Manitoba Architects' Association, the University of Manitoba established a chair in Architecture at the beginning of the present academic year with Arthur Alexander Stoughton in charge. Mr. Stoughton comes from New York City, where he has been actively engaged in the practice of architecture with his brother under the firm name of Stoughton & Stoughton, also as a city planner. Among other works the firm is responsible for the Soldiers' and Sailors' Monument on Riverside Drive in New York City, as well as the large group of the Canton Christian College in China.

The outline of a comprehensive four years' course, theoretical and practical, has been laid down and the present year has seen students in two classes doing the prescribed work. The course of study and routine are modelled on those of the best Eastern schools, his training at Columbia and in Paris and the practical experience of the head of the Department guiding him in the selection of methods. By a revision of the Architects' Act graduates of this Department are admitted to practice without further examination, after having spent two years in practical office work after graduation.

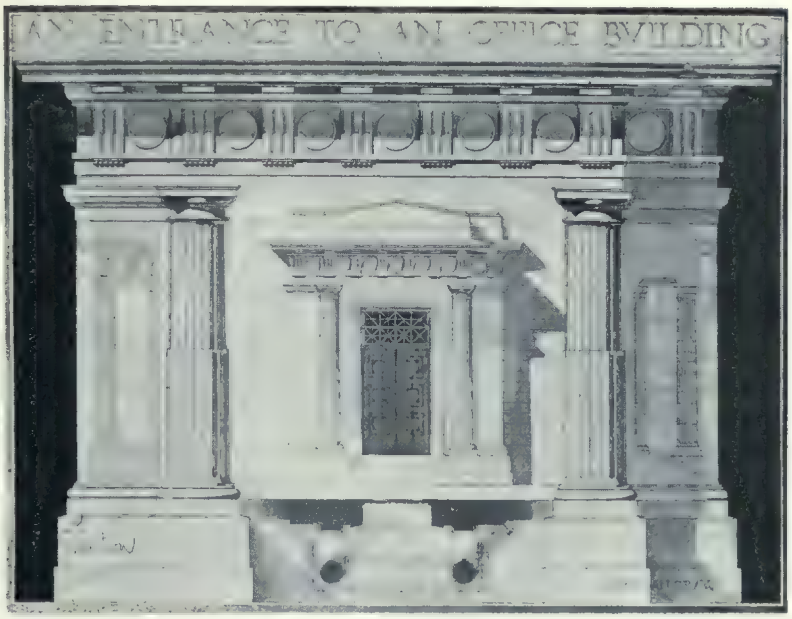
Besides the regular course leading to the degree, the Department admits students to partial work in an evening course of design, where instruction in the elements of architecture and shades and shadows is given preliminary to participation in designs from given programmes. The class is composed principally of draftsmen from the various offices who follow programmes, usually occupying one month each, which thus far have alternated between "order" and plan problems. The work in this class is similar to that of the Beaux Arts ateliers, some of the "mentions" in the first order problem being given in this issue, "An Entrance to an Office Building" in the Roman Doric order. The Department will occupy one floor of the Engineering Building shortly to be erected on the new site of the University at St. Vital.

* * *

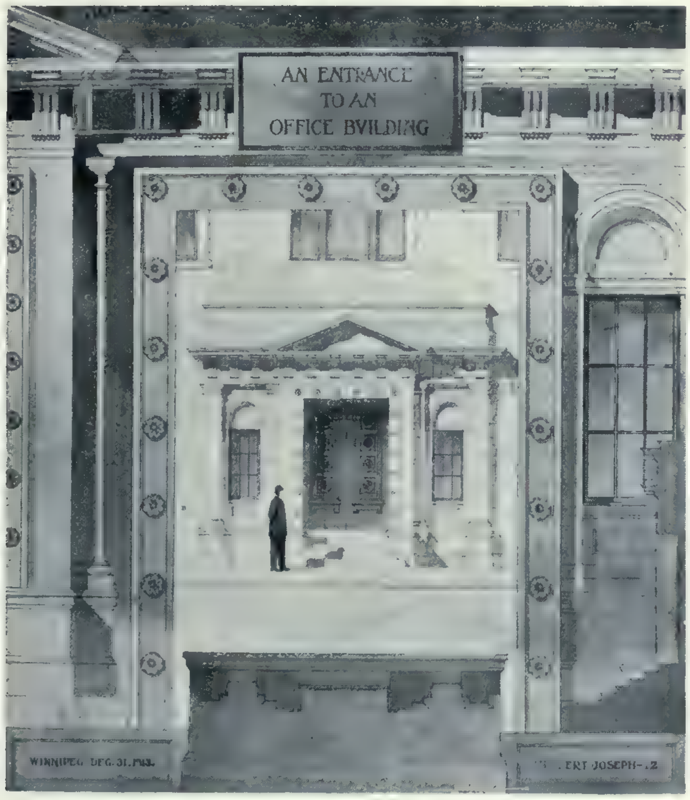
WHAT WILL BE the largest hydro-electric power station in Canada is now rapidly approaching completion at Cedar Rapids, in the St. Lawrence River, near Montreal. When this shall be first thrown into operation it will have a rating of 100,000 horsepower, which will be nearly doubled subsequently. It will ultimately have a capacity of 160,000 horsepower. Contracts for 80,000 horsepower were made before the work of building had been commenced. In many respects the equipment will resemble that of the Keokuk Dam, on the Mississippi, which was recently completed. The turbines, with a rating of 10,800 horsepower, are said to be the largest ever built.

THE TWENTY-EIGHTH annual convention of the National Brick Manufacturers' Association, held at New Orleans, was attended by three hundred and eleven members, representing the States and Canada. President Rogers in his annual address referred to the large and widely scattered delegations: "It is a great pleasure to look into the faces of so many of the representative manufacturers of clay products from all sections of the country. There are members here from most of the States of the Union, and I am especially pleased to note a large delegation from Canada. This is particularly pleasing inasmuch as this is the first time in the history of our Association that we have convened in annual convention so far from the geographical centre of our membership. After due deliberation your Executive Committee, with whom rests the responsibility of determining time and place of meeting, deemed it advisable to invite an expression on the part of the members as to the preferred place of meeting. With great unanimity you chose New Orleans. This diversion indicates anew the national scope and character of our organization, an incident which I am sure must be very gratifying to us all. . . . It is scarcely more than a decade since the building of improved highways was taken up in earnest by most of the States. What wonderful strides have been made and what a conspicuous part brick has taken in its solution is well known, and it is generally conceded that brick is superior to all other materials not only in the city streets, but in highway building as well. . . . What is true of brick as a paving material for streets and highways is true of brick for structural work: the initial cost being but slightly in excess of wood, admit of their use in the construction of the humble home. On the other hand, if desired, buildings can be embellished by artistic terra cotta and tile no matter how lavish the design or how extravagant the idea of the architect or owner. Brick and terra cotta meet every requirement of the builder whether for a modest home or a richly decorated edifice. . . . The general public welcomes conservation of our resources by National and State authorities. The time is not remote when all will realize how important a question it is, though little attention has been given it. The preservation of the forests is important: it conserves the water power that thirty years ago could only be used at the banks of the streams, since then the development of means for generating electricity, for transmitting it long distances and transforming it into light, heat and power at a low cost. Our country is comparatively new and so rich in resources that we are apt to forget they can be exhausted and will be if care is not taken to protect them from waste and exploitation. The policy of conservation is one of the

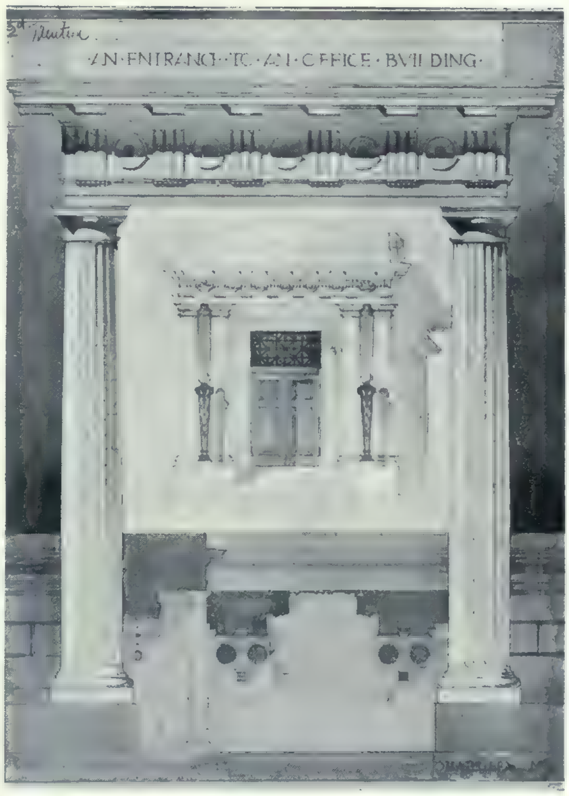
ENTRANCE TO AN OFFICE BUILDING.



DESIGN BY E. SHERIDAN GRAY.

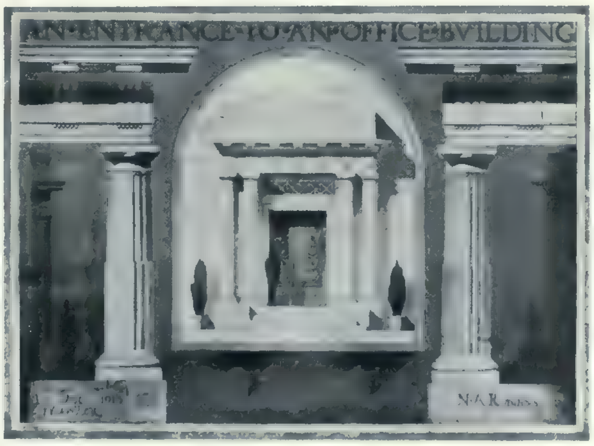


DESIGN BY HERBERT JOSEPH.



DESIGN BY OSWALD W. HILLERNS.

ORDER PROBLEM. EVENING CLASS OF DESIGN.



UNIVERSITY OF MANITOBA, WINNIPEG.

DESIGN BY NORMAN A. ROBINSON.

most important of our day and one in which we should all take an interest in seeing economically developed."

The following officers were elected for the ensuing year: President, Eben Rogers; vice-presidents, C. P. Moyer, C. Deckman, F. Salmen; secretary, T. Randall; treasurer, J. Sibley. The delegates were royally entertained during the convention, excursions being held between sessions. The annual banquet was held at the Grunewald, L. E. Bentley, of New Orleans, presiding. J. S. McCannell, of Milton, Ontario, was the first speaker, and responded to the toast, "Our Border Line." Other speakers scheduled were: D. V. Purington, Ocean Springs, Miss., "Our Chart;" Dr. William McF. Alexander, "Our Hobbies;" John C. Boss, Elkhart, Ind., "The Road to Happiness;" J. J. McLoughlin, New Orleans, "How to Throw a Brick;" Charles J. Deckman, Cleveland, Ohio, "Every Brick Man;" Herbert N. Casson, New York, "Shock Absorbers."

* * *

FOR THE FIRST TIME in the history of Canada, a definite and scientific plan has been developed in one of the Provinces, by which the public is to secure the benefit, in the form of increased revenue, of the rise in stumpage values on crown lands which will inevitably come as a result of limited timber supplies and steadily increasing demands. This plan is set forth in a bill now before the Legislature of British Columbia, which was introduced by Hon. W. R. Ross, Minister of Lands, following a most careful investigation by the Forest Branch, and a series of conferences with the limit-holders concerned. It is understood that the Bill harmonizes, so far as practicable, the interests of both the Government and the lumbermen, and that its early enactment into law seems assured.

In other Provinces, as also on the Dominion crown lands, there is no definite and well-understood plan for the gradual increase of stumpage dues, to be paid to the Government as timber values increase. Instead, this matter is taken up at more or less irregular intervals, usually at the end of ten-year periods, and the outcome is the result of a contest between the needs of the Provincial Government for greater revenue, and the natural opposition of the lumbering interests to material increases in the royalties. This situation, through the increase in timber values, has resulted in many of the limits acquiring a large speculative value, which is taken into consideration in transfers from one person or corporation to another, and this absorption of the surplus value has in turn made much more difficult the re-adjustment of terms between the Government and the limit-holders. Apparently, this difficulty will now largely disappear in British Columbia, under the new plan developed by the Minister of Lands and the Forest Branch. The settlement of the controversy will likewise be of great benefit to the lumbering interests, since it will materially facilitate the financing of lumbering operations, by removing the uncertainty which has hitherto prevailed as to tenure and amounts of royalties to be paid.

The essentials of the plan provided for in the royalty bill are explained in the following extract from the address by Hon. W. R. Ross, in presenting this matter to the Legislature for its consideration: "The Royalty Bill comprises these four things: It fixes the royalty increase for 1915, and establishes a level of lumber prices on which future increases will be based. It provides seven five-year periods for royalty adjustment; and it provides that for each of these periods a given percentage of the price increment for lumber shall be added to the royalty. This percentage is twenty-five per cent. for the first five years, and rises gradually to forty per cent. for the last five-years period. The fourth of the accomplishments of the Royalty Bill is to re-adjust the rentals between the coast and the interior, and fix them for the whole period of the Act."—*Conservation.*

* * *

THE TALLMAN Brass and Metal Company, who are making a specialty of electric fixtures, have secured the following contracts during the month of March: First Methodist Church, Hamilton; St. John's Presbyterian Church, Hamilton; First Presbyterian Church, New Glasgow, N.S.; office building for the Great Lakes Dredging Company at Port Arthur. Special designs of this work will be submitted on application.

* * *

TO ARCHITECTS—Superintendent of construction open to reengagement. Familiar with all kinds of construction, office buildings, hospitals, schools. Age, 35. Ready to assume charge of any extensive building operations. Address "Superintendent," care of CONSTRUCTION.

* * *

THE LAST WORD

in the art of manufacturing High Grade Surveying and Drawing Instruments has been developed in the Dietzgen Instruments, the possession and use of which guarantees accurate results.

Scales, Slide Rules, Draughting Equipment and Accessories of a complete list are also manufactured by us and sold direct to the Architect and Engineer.

BLUE PRINTS
made from tracings a specialty.

EUGENE DIETZGEN CO., LTD.,
116 Adelaide St. W., Toronto.

CONSTRUCTION

May, 1914 Vol. 7., No. 5

CONTENTS

EDITORIAL 167

Development of Vancouver Architecturally——The Potency of Canadian Clubs in the Social and Political Life of our Country——Sixth National Conference on City-Planning to be held in Toronto.

VANCOUVER, B.C. 171

NEW MASONIC TEMPLE, TORONTO, COMPETITION 181

TORONTO UNION STATION 199

HART HOUSE, TORONTO 203

ENGINEERING BOOKS 206

CURRENT TOPICS 208

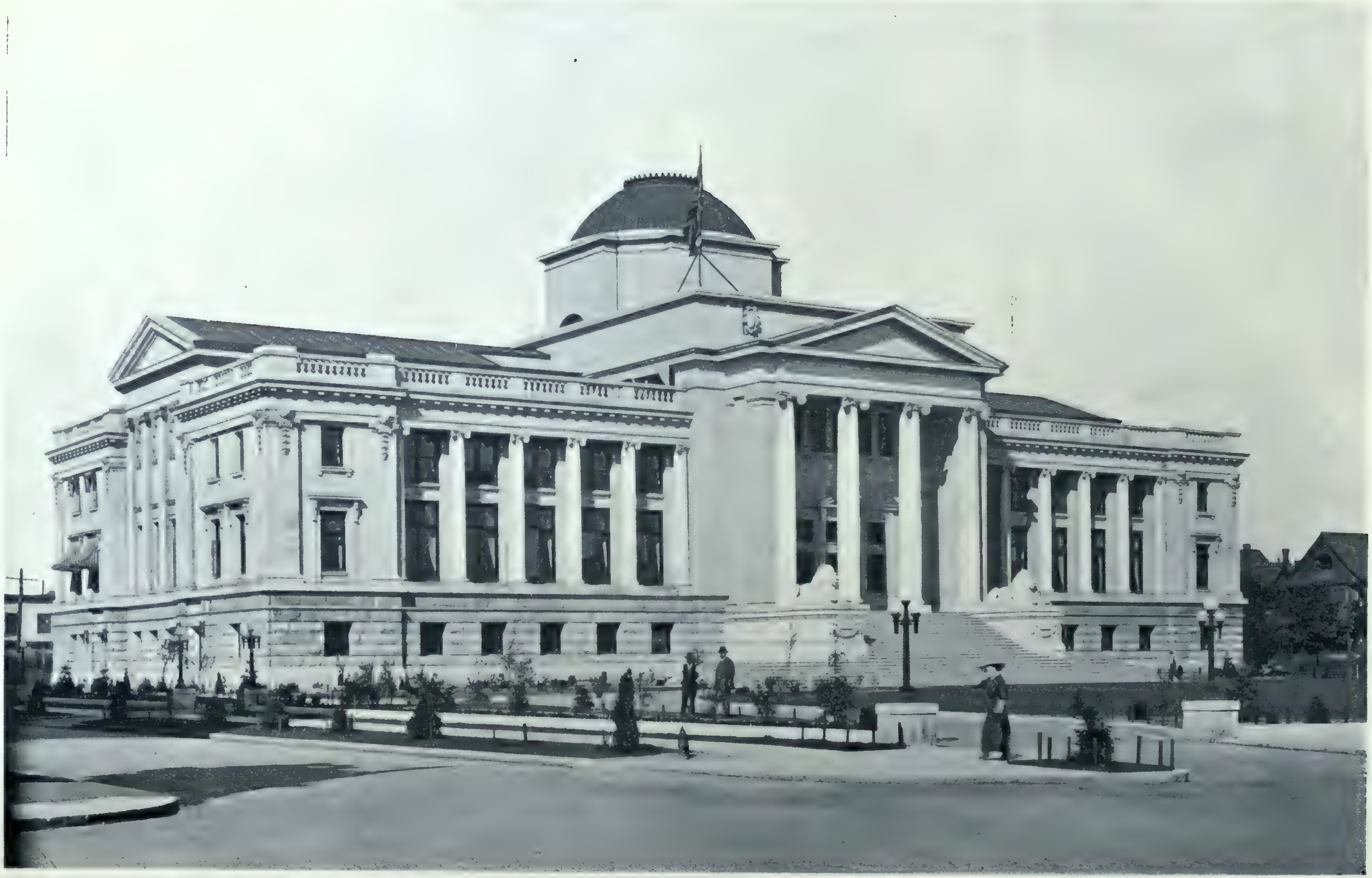
Full Page Illustrations

COURT HOUSE, VANCOUVER .... Frontispiece

VANCOUVER BLOCK, VANCOUVER 169

TWO SMALL HOUSES 207

H. GAGNIER, Limited, Publishers
GRAPHIC ARTS BLDG., TORONTO, CANADA
BRANCH OFFICES:
MONTREAL WINNIPEG CHICAGO NEW YORK



COURT HOUSE, VANCOUVER, B.C.

F. M. RATTENBURY, ARCHITECT.

EDITORIAL

Development of Vancouver in connection with the amount of building already done, the present agitation for civic planning and the future outlook.

THIS ISSUE treats of Vancouver in respect to her recent development in building. It has far surpassed the prophetic vision of her most ardent citizens and in a generation has changed from a primeval forest to one of the largest and most industrious cities in the West. While the present growth appears to be stinted somewhat in comparison with the phenomenal record of 1912, still the character of the work augers well for the future. Instead of so many office structures and apartments the more recent buildings consist of theatres, civic and club edifices, hotels and railway improvements—all of which are indicative of a progressive spirit along the lines of permanent advancement. The esthetic taste of the people are revealed along with their practical nature. There is an earnest desire upon the part of the citizens to have the city beautiful and an equal ambition among the artists to make it so. Not only do the buildings express this in their harmonious designs but the recent agitation in regard to a civic centre shows a marked tendency in this direction. The contour of the surrounding mountains, the water, in fact every feature of the city and surrounding country make it possible for Vancouver to become one of the most artistic and best planned creations in the world. And such a condition should rapidly become a reality. When all railroad facilities are completed she will be pre-eminent in this respect on the Pacific Coast and will, at the completion of the Panama Canal, furnish the most direct route to the Orient for all Canada. She will be the terminal port for the distribution of Dominion products to the Far East as well as to the various provinces of all materials coming from the Asiatic world. Furthermore, the industries of mining, lumbering, agriculture, and fishing are only in an embryonic state. With the development of her natural products and the completion of her new university, large docks and warehouses, sewerage and water supply schemes, Vancouver bids well to become the most prominent factor in the artistic and commercial life of the Pacific Coast.

The potency of Canadian Clubs in the social and political life of our country—A means of securing the execution of stable projects.

"CANADIAN CLUBS must be made the melting pots of Canada," said Lieut.-Col. Thompson, at the recent annual meeting of the Canadian Club held in Ottawa. Were this suggestion carried into execution, there would be eliminated from our midst considerable corruption which is always detrimental to a sane and steady growth. Clubs of this nature should be established in every city and town in Canada, having as their basic principle the eradication of every act which would prove a blot upon the country's honor. In this connection every phase of progressiveness would be justly considered and proper authorities consulted on all subjects. The club at Ottawa has become a potent factor in the social and political life at the Capital and keeps abreast of the times by securing the foremost men to speak to them on all live topics. At the last meeting, E. H. Bennett, who has been chosen by the Dominion Government to prepare plans for the development and beautification of Ottawa and Hull, spoke on City Planning and offered many helpful suggestions. In regard to the local work, Mr. Bennett said:

"It is not a question of the style of the buildings, but proportion of character and the selection of the style of building which will go best with the bluffs of the city. The commercial silhouette must be controlled. Some believe the plans will possibly forecast development similar to the capital of the United States. Let me set aside that idea for good. It is impossible in view of the topography. The development of Ottawa must be an expression not only of the climatic and natural conditions, but expressive of the race, and this will lead to results of a fine and lasting character."

With a frank expression of such matters before representative men, by one fully competent to grasp the existing essentials, there will be little, if any, trouble in securing the hearty co-operation of those in authority. And when once the people and the government are in sympathy with a project it will be promptly and wholesomely carried into execution.

Sixth National Conference on City Planning—First time to be held in Canada—Its scope of work, exhibition of plans, prominence of speakers.

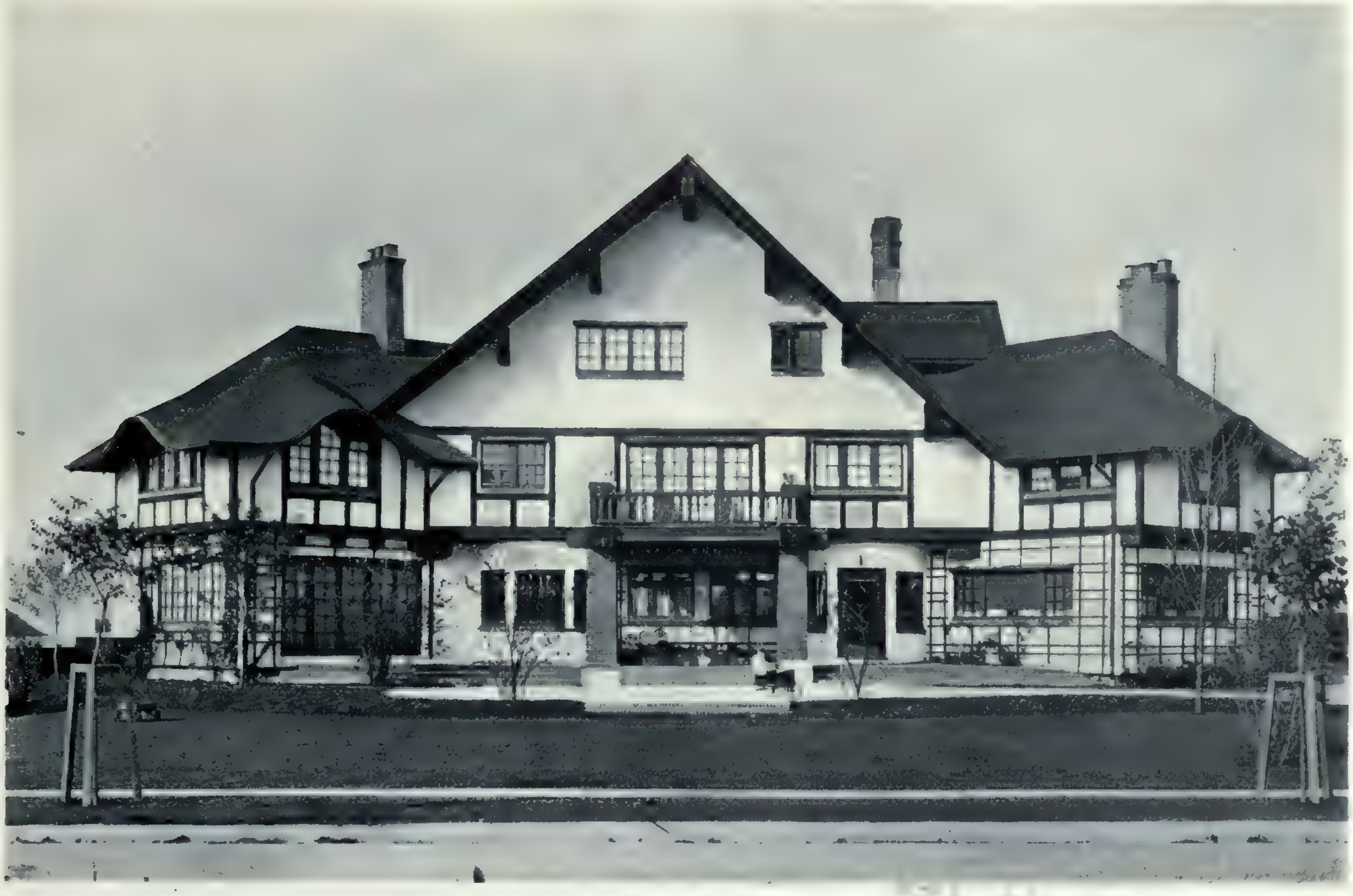
THE SIXTH National and the First International Conference on City Planning will be held at Toronto May 25-27, 1914. The benefits to be derived from this convention to every village, town and city in Canada are innumerable—mainly on account of the fact that they are already engaged in the work of city-planning, and will have an excellent opportunity of studying what other places have already accomplished under similar conditions. That the Dominion Government foresees the beneficial results accruing from this conference is evidenced in their appointing the Conservation Commission of Canada to act as host. The generous grant from this same source together with the financial co-operation of the Ontario Government and the city of Toronto, warrants the statement that this conference—national, provincial and municipal in scope—will do more towards the beautification of Canada and the saving of money and lives to the various municipalities than any other conceivable act.

The conference will open with an address from the Field Marshal H.R.H. The Duke of Connaught, the Governor-General, and responded to by Frederick L. Olmsted, chairman of Executive Committee of National Conference on City Planning, and Fellow American Society Landscape Architects. These men need no introduction and the same may be said of all the other speakers who have been chosen to present the various phases of city-planning. The following topics will be open for general discussion after being presented by men well qualified to handle the subjects assigned them: "The Relative Importance of City Planning as Compared with all Other Functions of City Government," by Andrew Wright Crawford, editor of the city-planning section of the Public Ledger; "Provision for Future Rapid Transit," by J. V. Davies, consulting engineer for the Brooklyn Rapid Transit Company; "Rapid Transit and the Auto Bus," by John A. McCollum, assistant engineer, Board of Estimate and Apportionment, New York City; "Protecting Residential Districts," by Lawrence Veiller, secretary and director of the National Housing Association, New York City; "Toronto's Water Front Development," by R. S. Gourlay, of the Toronto Harbor Board, and "Recreation Facilities in the City Plan," by H. V. Hubbard, professor of landscape architecture in Harvard University.

Unquestionably one of the most important features of the convention will be the consideration of the principles and procedure of a Canadian Town-Planning Act. The Conservation Commission of Canada has appointed a committee with Col. Burland as chairman to draft such an act which is to be freely discussed by experts from Canada, England, Germany and the States. This matter will be of universal interest. Hamilton, Ont. has deferred action in regard to city-planning until after this conference. Saskatoon is about to urge the Provincial Government to adopt a town-planning act. St. John, N.B., is also considering the adoption of an adequate plan to meet both her present and future needs. In fact, every Canadian city has or is considering the most practical and esthetic scheme for her own development along rational lines. Nothing could be of more vital importance than a Town-Planning Act comprising the fundamental principles necessary for each city which contemplates the enlarging and beautifying of its parks, streets and environs.

The exhibition in connection with the conference will consist of a large number of models, plans and diagrams shown recently in New York City as well as the work already accomplished in Canada. The variety of subjects alone will convey a slight idea of the vast amount of material to be presented. The exhibits are classified under: Comprehensive plans; civic centres and public buildings; planning of streets; housing the people; garden cities and suburbs; water supply and sanitation; parks and playgrounds; waterways; docks and bridges; railroads and transit; and helping industrial prosperity. It is to be sincerely hoped that all architects and engineers who are the authors of plans possessing special interest will communicate with W. S. Tecky, Commission of Conservation, Ottawa.

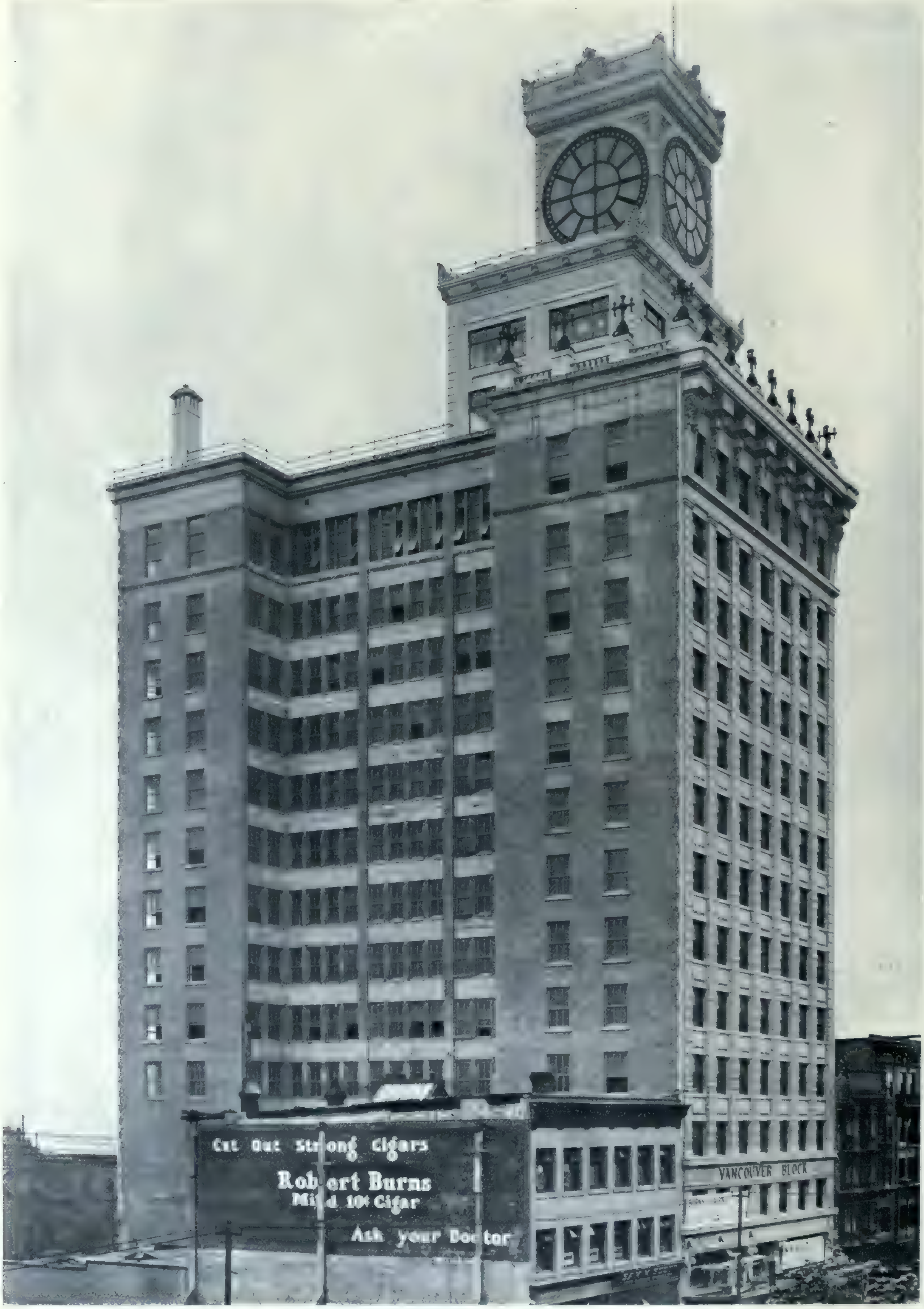
City-planning is a live question and needs the hearty co-operation of every person directly or indirectly interested. Too much credit cannot be given to the various people behind the city-planning movement. The high standing in their own profession of the men on the different committees show the importance as well as the broad scope of the work. The personnel of the speakers at the coming convention is indicative of the care taken by those in charge to have the best authorities discuss the most essential questions of the day. The exhibition illustrative of what has been done and is being accomplished will probably be the largest and best collection ever brought together. The invitations issued and the replies from all sources, including mayors, chambers of commerce, plan and park commissions, housing associations, engineering societies and architects, reveal the widespread desire to make this conference larger and more helpful than any other one held up to this time. And with the results already accomplished this can be done if the committees in charge receive your individual co-operation.



HOUSE BY T. ROBERTSON, ARCHITECT.

HOUSE BY MACLURE & FOX, ARCHITECT.

RESIDENTIAL WORK AT VANCOUVER, B.C.



VANCOUVER BLOCK, VANCOUVER, B.C.

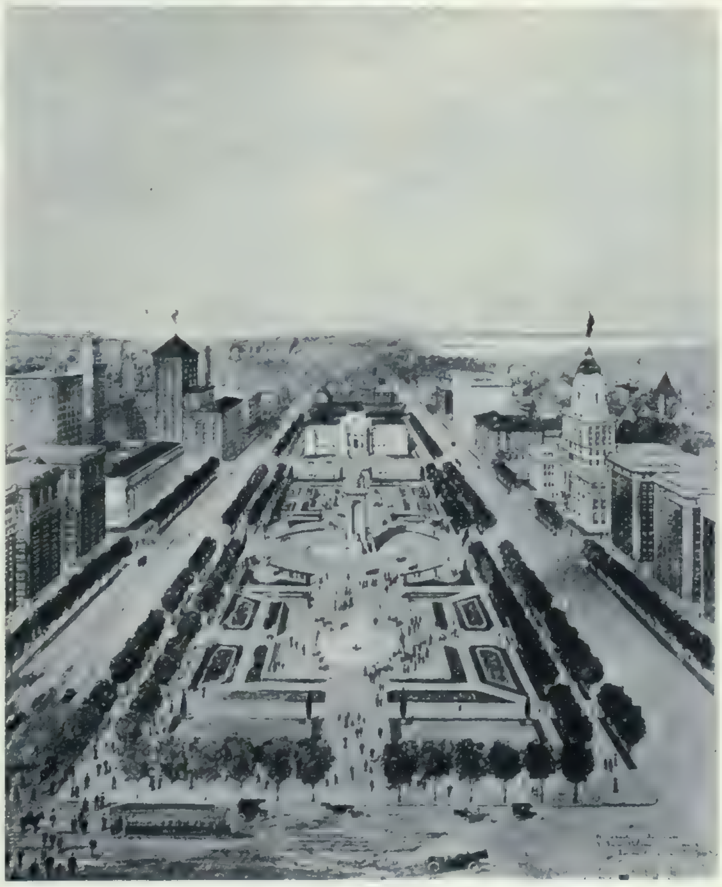
Vancouver, B. C.

THE growth of Vancouver during the last few years has been phenomenal. Springing from a wilderness less than a century ago it has become one of the large industrial centres of the growing West. During 1912 and 1913 over $30,000,000 was expended in buildings, while many large projects are still in the course of completion or about to be started. The question of a civic centre has been constantly kept before the people, but only recently has it been made a vital issue. A scheme has been proposed which has received the endorsement of the commercial and industrial organizations of the city. The plan in addition to the group of central buildings includes the widening and beautifying of streets connecting Stanley and Hasting parks, located at extreme ends of the city. Monuments and fountains will be erected along the radiating thoroughfares which lead to the parks mentioned above.

The growth of Vancouver and the unprecedented commercial and industrial development of the territory in its immediate environments have been so rapid in recent years that the energies of the people have been directed to material interests, commercial enterprises, and development schemes, to the neglect of the artistic features or the beautifying of the municipality. The unusual activity in real estate and the rapid rise in values have encouraged the acquisition of centrally located properties in Vancouver for private enterprises and speculative purposes, while the demand for business houses and office buildings has been such as to encourage the construction of edifices to meet an emergency demand at high rental values.

This abnormal condition has resulted in the growth and development of a city possessing great commercial and industrial interests, but lacking in many respects the artistic features of a metropolitan municipality. There are many splendid and artistic buildings in the business section of Vancouver, but they are so distributed and interspersed among smaller structures lacking in substantial and artistic features that their attractive appearance is lost or negatived in the general ensemble. Telegraph, telephone, and overhead trolley wires form a network along the business thoroughfares, and the poles on which the wires are strung obstruct the view and give to the long straight streets an unsightly appearance. It is to correct these defects that the present movement for a civic centre has been started.

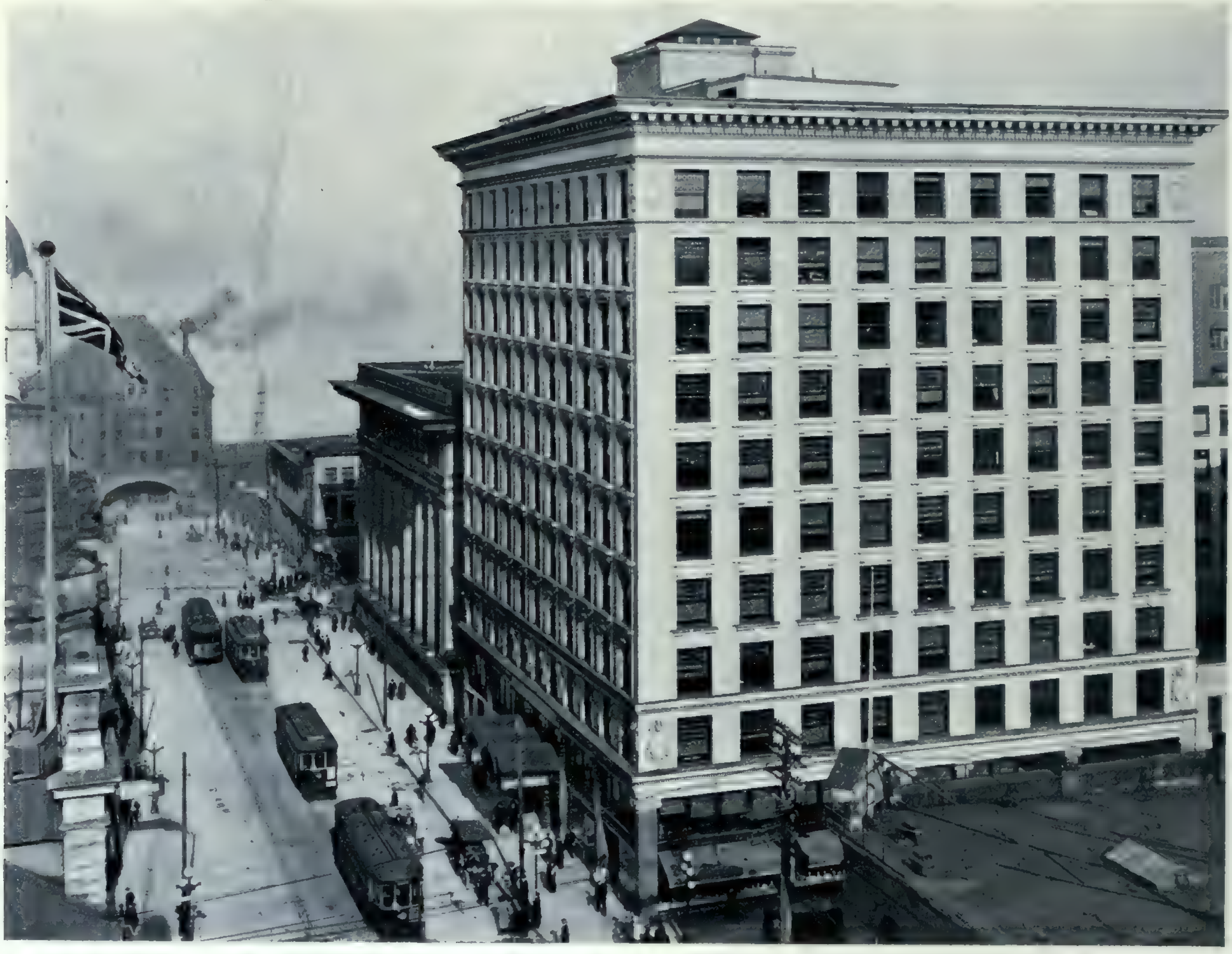
At the last municipal election the voters of Vancouver approved the plan for a civic centre and the location for a new city hall. The plan now under consideration is to use as a nucleus some vacant properties owned by the city and to acquire others either by purchase or expropriation, within a radius bounded by Beatty, Cambie, Pender, Howe, Georgia, and Hastings streets. This district is in the centre of the business section, where the principal thoroughfares converge, and is admirably adapted to the purpose outlined in the plan.



CIVIC CENTRE SCHEME. SOMERVELL & PUTNAM, ARCHITECTS.

Several of her recent commercial buildings are shown herewith as well as examples of the residential work. The Birks building is located at the corner of Granville and Georgia streets upon a site 100 by 120 feet; faced in glazed terra cotta on the main facades and white glazed brick in the courts. Upon the interior the main floor is occupied by a retail store while the remaining portion of the building is arranged in offices. The structural parts are of reinforced concrete; stairs of marble; vaulted ceilings with ornamental plaster; marble terrazzo floors, and hardwood trimmings.

The Yorkshire building has ten stories; a frontage of fifty feet and a depth of one hundred and twenty feet. Built of reinforced con-



ROGERS BLOCK, CANADIAN BANK OF COMMERCE, AND C.P.R. STATION.

crete, the front is faced with white glazed terra cotta and the sides with pressed brick; the base course being of granite. The decoration of the main lobby consists of terra cotta with gold leaf ornament at the top and marble flooring. All corridors are wainscotted with glazed tile three feet high having glass partitions above. The ground floor is equipped for banking purposes; the floors being of terrazzo, counters and partitions of selected oak. The upper stories which have cork linoleum floors are to be laid out according to the wishes of the tenants. Equipped with a vacuum system of heating, the cost of the completed structure approximates $300,000.

The Hotel Vancouver still in an unfinished condition, is faced with brick and terra cotta. In the main entrance vestibule marble, mosaic and terrazzo tile will be used for the floor and ornamental plaster for the ceiling. The vestibule will contain 20 pillars, each of which is to be panelled in marble to a height of 4 feet and above that in Austrian oak. A similar style of wainscotting will be used for the entire ground floor. The building will contain 700 bedrooms altogether, each room having access to a private bathroom. All bedrooms will be fitted with solid oak doors and the interiors will be finished in white

HASTINGS STREET WEST.

HASTINGS STREET, DOMINION TRUST BUILDING TO RIGHT.

enamel. A convention hall measuring 50 by 100 feet will be one of the features of the Granville street wing. Provision has been made for a billiard room of similar dimensions directly underneath the convention hall in the basement. The hotel will have four main entrances altogether, one of these being in the Granville street wing and leading directly to the convention hall. A roof garden with pergola measuring 60 by 200 feet will comprise the entire 16th storey of the central building. There will be 18 electrically operated elevators in the hotel. The cost of the entire contract is expected to run as high as $2,500,000.

In the competition for the Provincial Royal Jubilee Hospital, L. P. Rixford was awarded first prize; Somerwell & Putnam second and James & Davidson third. Fifty sets of drawings were submitted, many of which received merited comments from J. D. Atchison, advising architect in charge of the competition.

Mr. Lindsay in commenting on the future development of Vancouver, says:

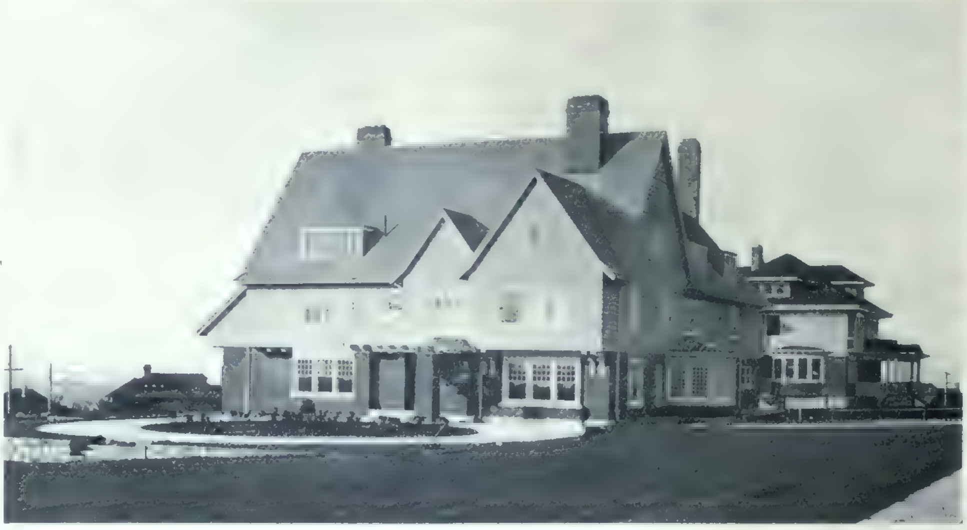
"Vancouver is to be, in the very near future, the converging point of six great transcontinental railroads, and in addition to these there are some three other railroads projected, which will connect these transcontinental lines, opening up very large tracts of land to settle-

GRANVILLE STREET.

PANORAMIC VIEW

ment. Two of these are now nearing completion. Vancouver, now the principal port of call of a large number of ocean-going craft of all descriptions, is to be the Pacific Coast terminus or principal port of call for fourteen great steamship lines, and as Vancouver's harbor is accessible to the largest vessels afloat, it will rank second to none on the Pacific Coast."

At a recent meeting of the Vancouver Chapter of Architects, J. W. Mawson read a paper on "The Modern Landscape Architect." After defining landscape architecture as the art of co-relating the component parts of a scheme over large areas and showing how it aims at producing a collective effect from the scattered units whether they be ecclesiastic, public or domestic buildings, trees, green sward, roadway or flower beds, he asks: "Are not architecture, horticulture, engineering and all the other factors which go to the making of a city or domain parts of one great art or science? Yes, in one sense, and that art is landscape architecture. As an art or science comes to be very fully known and the volume of its precedent increases, its adherents find it necessary to specialize and devote themselves to one portion of the subject, leaving the development of other branches to their confreres, each specialist sharing in the advances made by the others and contributing to the general progress of the science as a whole.



HOUSE BY SOMERVELL & PUTNAM, ARCHITECTS.

"Unfortunately there is sometimes the danger that in this subdivision of labor there may be the neglect of the art in the elaboration of its parts; thus in architecture, which depends for its success more than any other art upon correct staging, we are rapidly awakening to the fact that in the study of individual buildings we have neglected the greater and broader subject of landscape architecture. We have looked upon each unit in the composition too much as an entity in itself and too little as a component part of a larger scheme, and not until we can conceive of the individual creation in its dual capacity can architecture reach its highest development in the attainment of true art.

"It may be objected that it is impossible to conceive of any building apart from its site and, therefore, design and staging cannot be dealt

OF VANCOUVER.

with separately by the domestic and landscape architects. While it is true that environment will influence the least responsible designer, so far as the design of his particular unit is concerned, it is only the influence of immediate surroundings on the unit, and that very partially, which he realizes; the greater possibilities contained in the opposite view, the relation of the unit to its surroundings are entirely neglected.

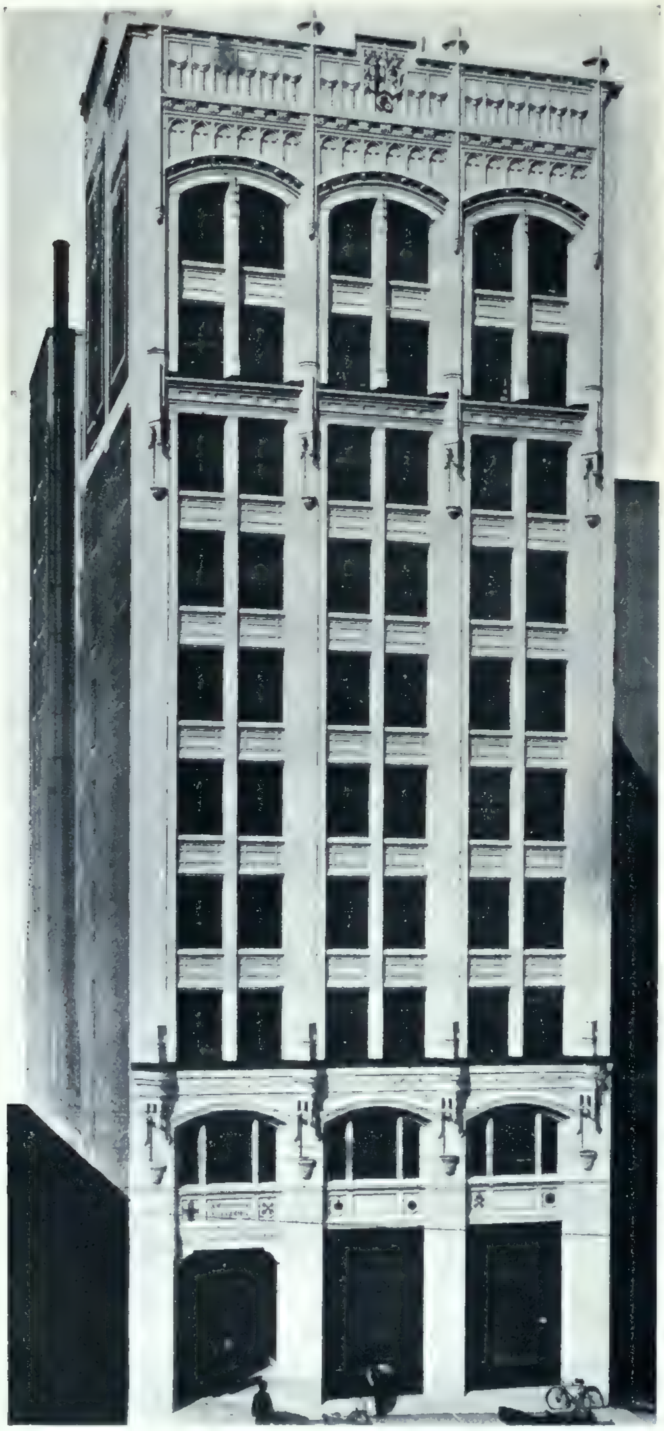
''In no sense of criticism, I refer you as an example on this point to our own Shaughnessy Heights. While many of the buildings are in themselves of exceptionally good design, I always feel, and I am sure you must feel also, that there is almost a total lack of harmony, viewing the property as a whole, and that sometimes the clash of color or style in two adjoining houses almost sets one's teeth on edge. That the need of a master hand to co-relate and to co-ordinate these units should ever have been lost sight of is due, not so much to egotism on the part of those in charge of the various sections of the subdivision, as to the lack of adequate representation from which landscape architecture has suffered; the lack, that is, of a strong man to fill the post and worthily uphold the traditions of his office.

HOUSE BY GRANT, HENDERSON & COOK, ARCHITECTS.

''In an article entitled 'Vancouver, a City of Optimists,' written by my father for the 'English Town Planning Review' a short time ago, there is a passage which reads: 'Where was primeval forest yesterday, men are living and trading to-day and to-morrow there will be a great city, and to one's mind instinctively leaps the thought, what will the men of to-morrow say of the city which we of to-day have bequeathed them? Will it speak only of meanness and narrowness of outlook and its topography, fixed more or less for all time, fill them with despair, hamper their commerce and stifle their love of the beautiful at their very doors? Or can we, by the inception of a wise policy and its steady pursuit, with our eyes ever on the goal set before us, insure that generations yet unborn shall hold our efforts in grateful remembrance?'

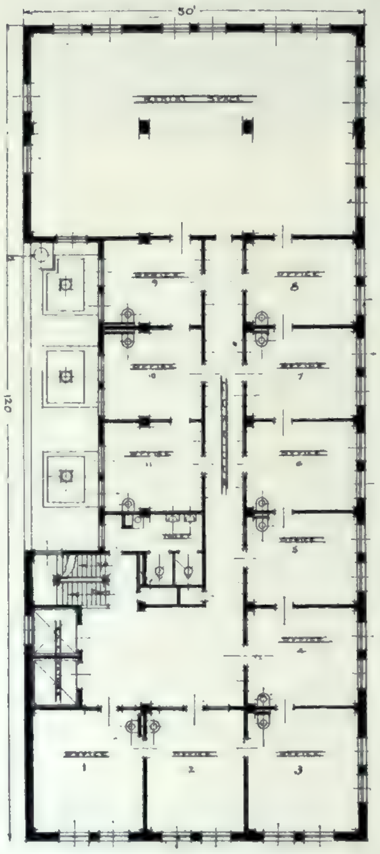
''Gentlemen, I ask you to seriously put this question to yourselves: What are we doing in Vancouver to ensure that generations unborn shall hold our efforts in grateful remembrance? For myself I would answer with shame: 'We are doing nothing.' It is true we are a city of optimists, but our optimism is of the Micawber type, we are waiting for something to turn up.

While almost every city on the American continent, including the Eastern and Middle West cities of Canada, are actively engaged in setting their house in order and so regulating their growth that no monies shall be wasted and every unit be built from year to year according to a wisely preconceived policy. Vancouver, a city blessed with more natural advantages of location and beautiful surroundings than any other city on the continent and an almost perfect site from a topographical point of view, is drifting blindly into all the mistakes which the old world cities are regretting so bitterly today. Yes, even Athens, the most beautiful city in the old world, so rich in historical association and the fountain of inspiration for 2000 years of architects, sculptors and painters, has finally been called to book.



"Gentlemen, we may load our cities with beautiful and chaste buildings and handsome tree-lined boulevards, but if we neglect the fundamental principles of public health, housing of industrial classes and transit facilities, our work will have been in vain, and our beautiful building stand as monuments of our wasted opportunities.

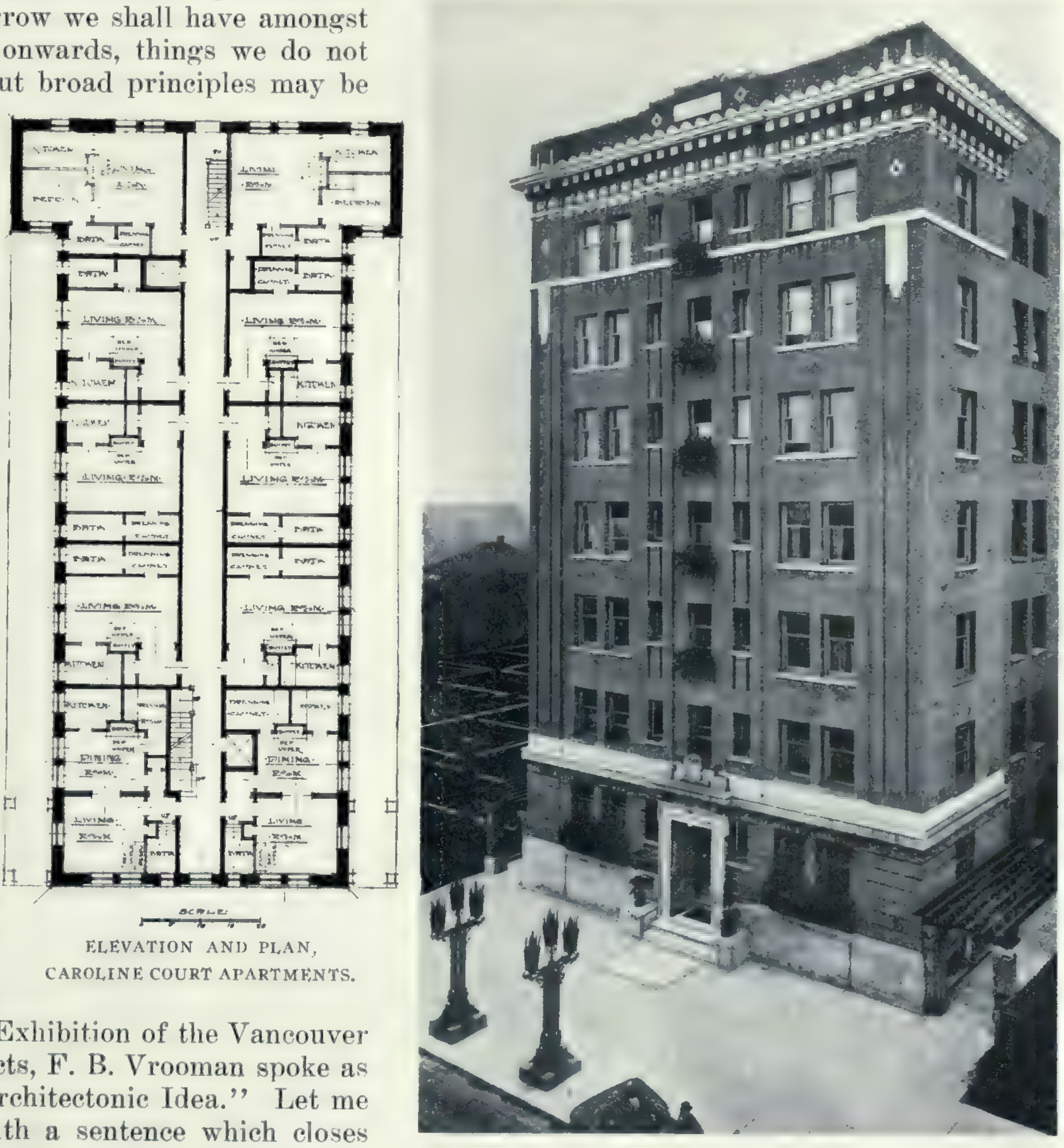
"How many of us have taken thought for tomorrow except of what we shall eat and drink? What arrangements have we made for dealing with the great volume of shipping which all believe is coming to our port with the opening of the Panama Canal and the operation of our great transcontinental railways? How are we to house our freight? What area must be given over to commerce? Where are we to house the men and their families who will handle this trade? Where are the administrative, educational and recreative centres to be located, and, finally, how are we going to take care of the vastly increased surface traffic which must inevitably follow any increase in population or industry?



ELEVATION AND PLAN, YORKSHIRE BUILDING.

"That is the past. What of the future? How are we to ensure that our city will be healthful, convenient and planned on generous lines and, therefore, beautiful in the days to come and a fitting place in which to work and live, and who is responsible for the future? Primarily, we are, each one of us, responsible, because we are the men who elect the members of the city council, who are, after all, only the civic executive public servants, and they can do no more than put into effect the legislation which is dictated by public opinion. Cannot we, in this growing city of Vancouver, arouse public sentiment to the point of deciding a settled policy of city improvements, and say that we will not pull down next year what we did this year, because we find that we have to go a little further, and because what we have done will not work into our schemes for improving the next block. Cannot we say that we will have a plan and a descriptive report, or whatever it is, which will show us what we intend to do in the next hundred years, so that we do not have to start all over again with every new city engineer or council? It may be impossible to tie ourselves down in detail. Modern invention proceeds so rapidly that to-morrow we shall have amongst us, and every day onwards, things we do not dream of to-day, but broad principles may be made, and it is for these we should prepare, and for which we should lay down a policy.

"Furthermore, this question is right here with us to-day, and it is up to each one of us individually and as a society to strain every effort and nerve to secure the only possible and desirable end where our city is concerned, but to create and adhere to, for all time, a policy and plan which will be worthy of a city so liberally endowed by nature with the good things of life."



ELEVATION AND PLAN,
CAROLINE COURT APARTMENTS.

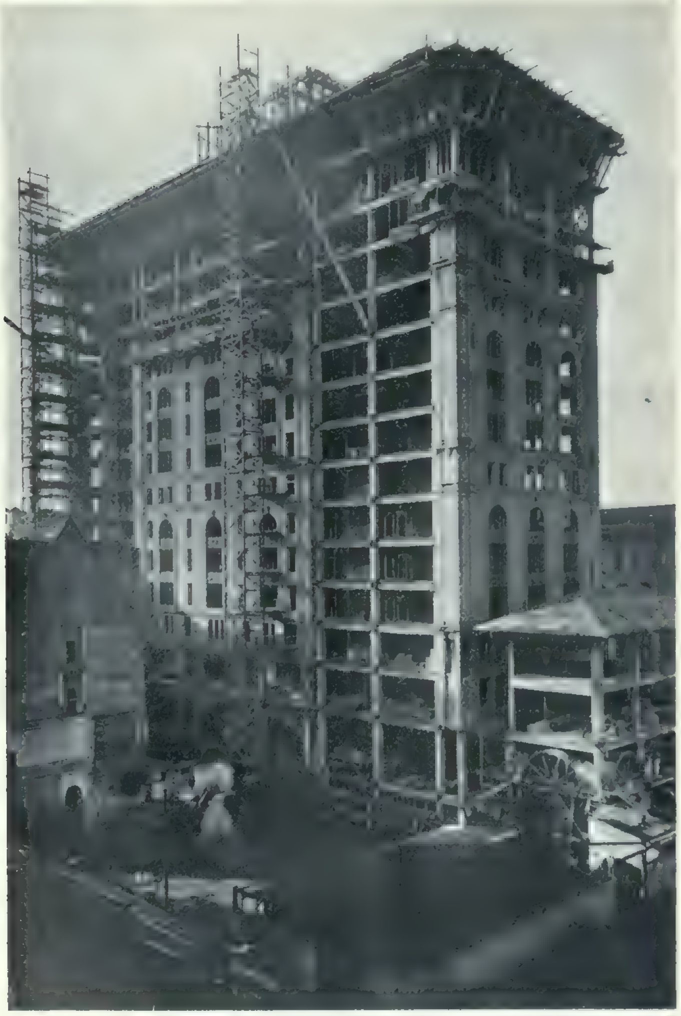
At the first Annual Architectural Exhibition of the Vancouver Chapter of Architects, F. B. Vrooman spoke as follows on "The Architectonic Idea." Let me open this paper with a sentence which closes one of my books. It is a happy phrase of Dr. August Forel: "Let us not abandon the race to the fatalism of Allah; let us create it ourselves." That we ourselves have anything to do in the matter of making the world we live in, or making it a better or happier place to live in, seems little to have entered the thought of the vast majorities of mankind.

The fatal error and the hopeless outlook of our prevailing philosophy of life is in our point of view. It is the individual man. It is each for himself. The outlook of the world is the outlook of the individual. The creed of the world is that the universe must be interpreted from the standpoint of the individual, not the individual from the standpoint of the universe. Now, my claim is that the regeneration of the world is impossible until that time comes when men are willing and able, each to adjust himself, the fragment to the whole—and that not only, but in that harmony of relationship with the other units as real as himself, which will do no violence to the architectonic idea.

The architectonic idea carries with it something creative, harmonious, efficient and artistic. Primarily, the idea underneath the old Greek word "architecton" is, that behind the building's deed is the builder's thought. It involves policy or program, foresight, unity of design, and aim.

I have no intention of entering into any technical discussion of the subject of architecture, which every one of you understands so much better than I; but if I can make an application of the idea which underlies your work, this brief paper will not have been written in vain. Furthermore, it is no part of my design to make a

BIRKS BUILDING BY SOMERVELL & PUTNAM.



VANCOUVER HOTEL BY F. S. SWALES.

plea for the architect's drawings and designs in building a house, since the world is fairly well educated to that point by this time. I wish to point out two directions where I believe the architectonic idea may be applied in the future for the vast betterment of mankind. I refer, first, to the city, and second, to the state.

Every city, especially a new and young and vigorous one, should have enough public spirit to begin its work for the future on intelligent lines, and there is no way of beginning a city without the great outlines of architectural plans; and by architectural plans I do not mean merely that part which pertains only to its landscape gardening, if I may use the phrase in the larger sense, but everything which pertains to its engineering efficiency in the practical administration of those affairs which deal with every day life of all the people, like transportation and traffic, like sewage, water and light, and things of that type.

Here we are in Vancouver, where less than a generation ago stood the ancient forest. In an area which alone is large enough for the future metropolis of the Empire on this ocean, have sprung up nearly a dozen separate municipalities without co-ordination or co-operation—without engineering efficiency or financial economy. Some efficient support has been given by the Park Board—all they could give it as to parks—but so far very little has been done at all adequate to meet the daily necessities of the people, and especially the children growing up, to give them open breathing spaces.

Very little has been done in the way of the great outline of the architectonic idea, which should be started by throwing this great area of the Burrard Peninsula into its three distinct and separate zones, which for the most part should not be mixed. First, the shipping and industrial district; second, the down town and retail district; third, the residential district. Now, in broad outlines, these districts should be distinct and separate zones. The residential district should not be invaded by factories with their clutter and smoke, nor indeed by the riff-raff, nor the residences of the riff-raff who always haunt the water-line about the wharves of every great shipping centre in the world—men of every nationality, and of no country for the most part, but who live on ships upon the sea. Such people should be segregated from the residential district of every great city. Then again the industrial population of a city should live near their workshops or factories, and these workshops and factories should be in the closest inter-relation with the ocean and railroad terminals. In other words, any intelligent plan for a city will involve vast areas laid out, which shall be sufficient for all needs of a reasonable future time for the closer inter-relation of industry and commerce. I do not mean retail trade, I mean industry and commerce, and they are two different things.

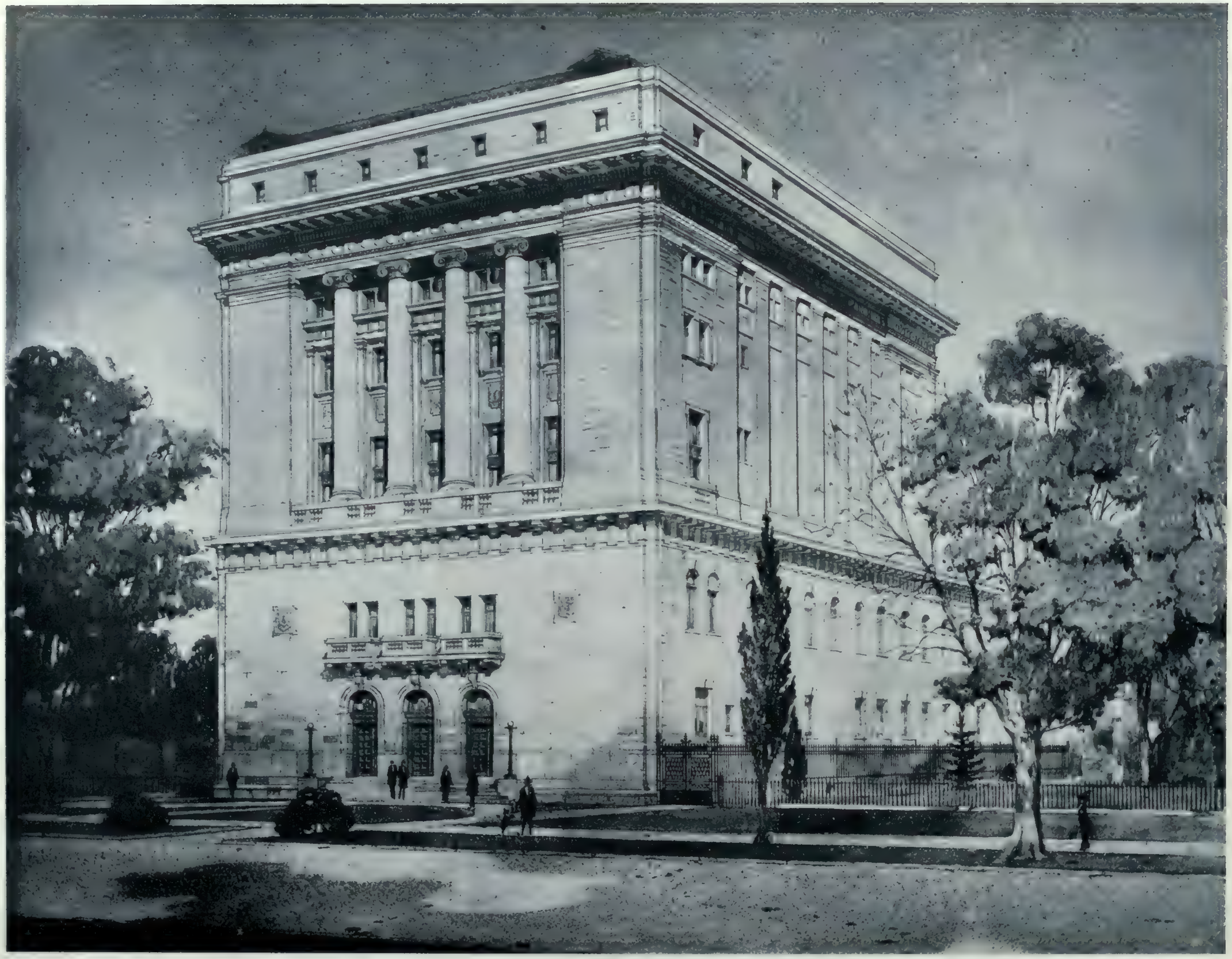
In speaking of the architectonic idea as applied to the state, it is necessary to call attention to the almost hopeless condition of Anglo-Saxon politics. There is something fundamentally wrong in our politics. It is opportunist; it is partisan; it is founded on interests, not principles It appeals to selfishness, not patriotism. The consequences is, it is corrupt, and the corruption of Anglo-Saxon politics especially in Canada and the United States is undermining the respect of the common people for law and order, and in this is the great danger in the immediate future. The average political life of the average politician is guided by no over-ruling principle, no devotion to the common good. Back of this yet is our general philosophy of life, in which we have accepted the gospel of laissez-faire. It is a political expression of the general doctrine of individualism, stated briefly—every fellow for himself. It is the "personal liberty" idea, carried to impossible extremes, forgetful of the fact that there is no real freedom except through law and order. In architecture we would have the same doctrine, if it were allowed, that every brick-layer, and every hod-carrier is at liberty to do whatever may please his passing fancy in the house he is helping to build. It is the gospel that every ignoramus can change the architectural plans of the expert in the city being planned. It is the theory, that any fool can become a statesman, whether he is square or dishonest, wise or otherwise.

The greatest need of modern politics is a rational and constructive democracy. I do not mean the democracy of individualism which is undermining the very foundations of law and order, but an architectonic democracy. That which holds the old regime together is self interest. Something larger and better must be substituted—the motive of goodwill and the purposive mission of the state, "to promote the general welfare."

HOUSE BY GRANT, HENDERSON & COOK, ARCHITECTS.

The Architectonic Idea is not a creation of man applied to political theory or practice. It will be, when it comes, the discovery first, and then the realization in the relations which exist among men, of the order of the universe. Some day, let us be allowed to hope, that the future Architect of the State will build the great Temple of Humanity upon the earth as the Great Architect of the Universe has built under the sky. "Let us not abandon the race to the fatalism of Allah. Let us create it ourselves."

HOUSE BY MACKAY R. FRIPP, ARCHITECT.



WINNING DESIGN,
MASONIC TEMPLE,
TORONTO, ONT.

H. P. KNOWLES,
ARCHITECT.

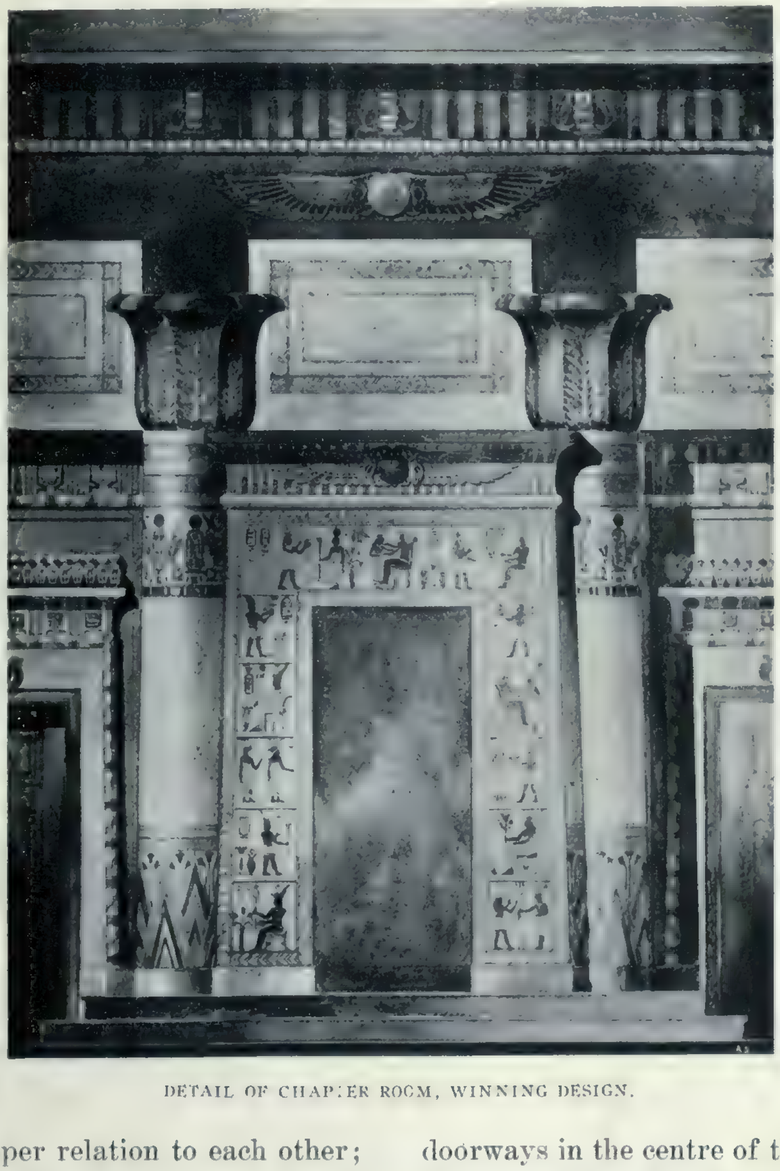
New Masonic Temple, Toronto, Ont.

C. H. Boyles

THE recent competition held in Toronto for a new Masonic Temple building was of unusual interest in that the contestants were from all parts of the Dominion, the fourth prize being won by an architect in the extreme West. Forty-one plans were submitted, most of which depicted the character of the building for which it was to be used and expressed a careful consideration of the problem from an esthetic as well as a practical standpoint. The successful competitors were: First prize, H. P. Knowles, New York City; second prize, John M. Lyle, Toronto; third prize, Hutchison, Wood & Miller, Montreal; fourth prize, A. W. Gould and A. E. Harvey, Victoria, B.C. The new temple will be erected on the west side of Spadina road north of Bloor street on the site of the house formerly occupied by Sheriff Mowat. The lot has a one hundred foot frontage with a depth of one hundred and ninety-eight feet.

The report submitted with the winning design by H. P. Knowles, the architect, is as follows:

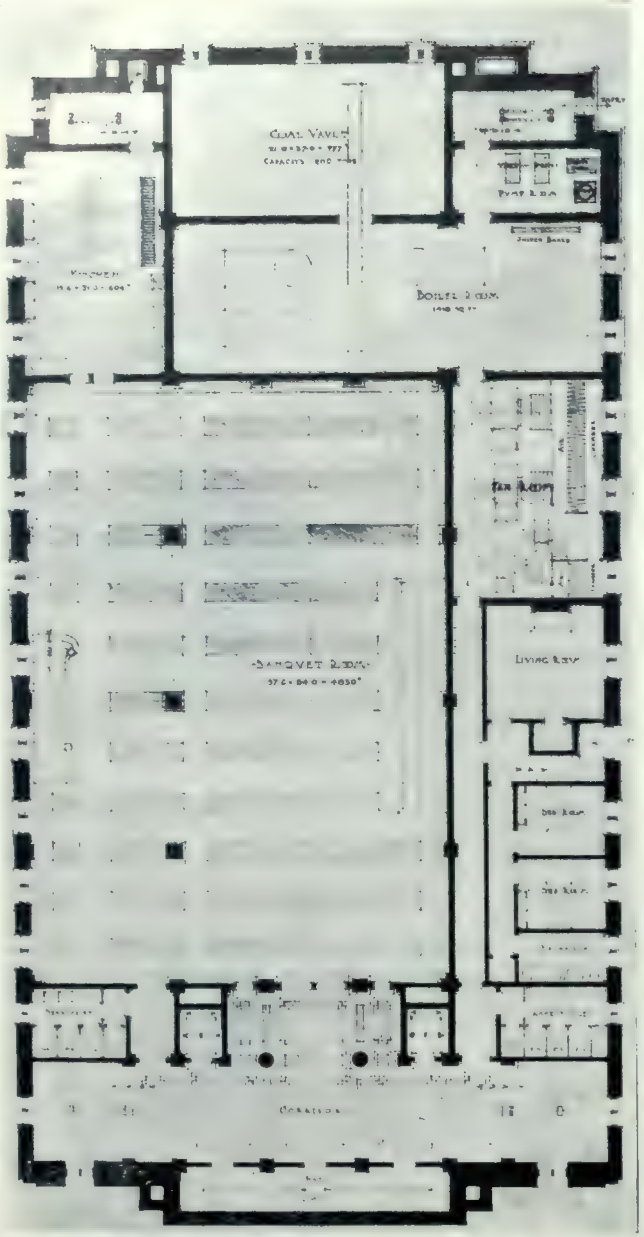
The claim made for this building is its simplicity and compactness; in fact, it has been condensed as much as possible and still comes within the requirements of the program. The connections and circulation are direct; there is little or no waste space; the various rooms are well shaped and bear proper relation to each other; and this squareness and directness naturally simplify the construction.



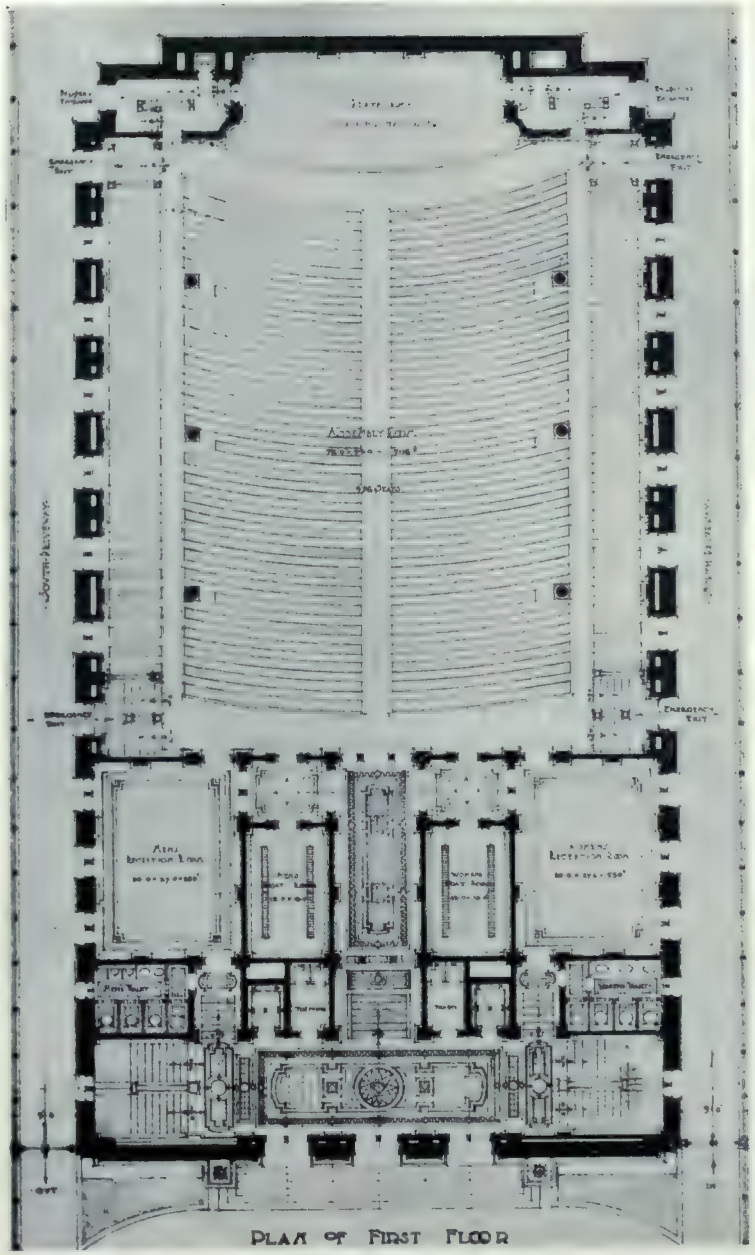
DETAIL OF CHAPTER ROOM, WINNING DESIGN.

Structural Details.—The building proposed is fireproof throughout; the framework to be a skeleton of steel columns (formed of channels and plates), beams and girders, the floor arches to be of terra cotta blocks or reinforced concrete as may be decided when estimating. The entire structure including the outside walls is to be carried on this steel framework. All outside walls are of brick, stone or terra cotta as indicated. Owing to the length of spans between supports in the assembly room and the various lodge, chapter, Scottish Rite, and Preceptory rooms, heavy steel girders will be required. All staircases will be constructed with steel carriages, cast iron risers, ornamental cast iron strings and wrought and cast iron balustrades, and marble treads. All interior partitions are of hollow terra cotta blocks; all floors in entrance and staircase halls, in corridors and toilets, shall be of marble mosaic or terrazzo mosaic; and all floors in lodge rooms, ante rooms, banquet rooms, etc., shall be of oak laid over cinder-concrete fill. All exposed steel members to be protected with not less than two inches of fireproof material, either burnt clay or concrete. All interior wood trim, doors, panelings, etc., to be of hardwood, the cores of which shall be treated with an approved fireproofing solution.

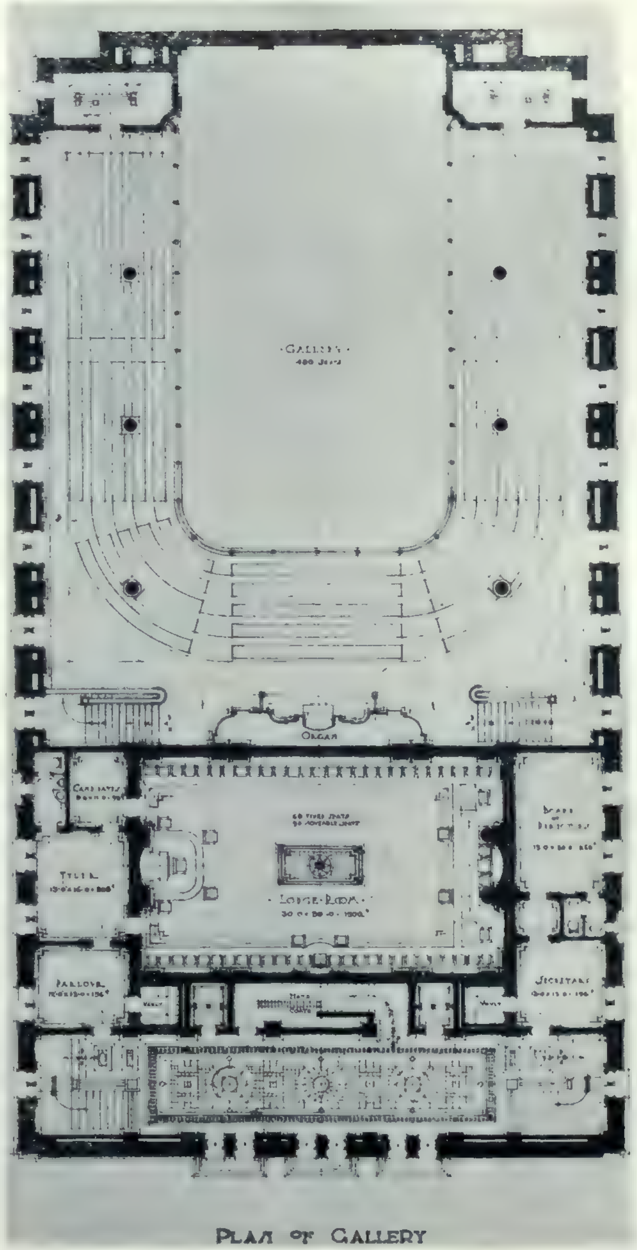
Interior Arrangement. — The building is entered from the street through three 6 ft. doorways in the centre of the front into a broad entrance hall extending the full width of the building; at either end of which is located a broad, handsome staircase. The floor of this hall is lowered 4 ft. below the general first floor



BASEMENT.



FIRST FLOOR.

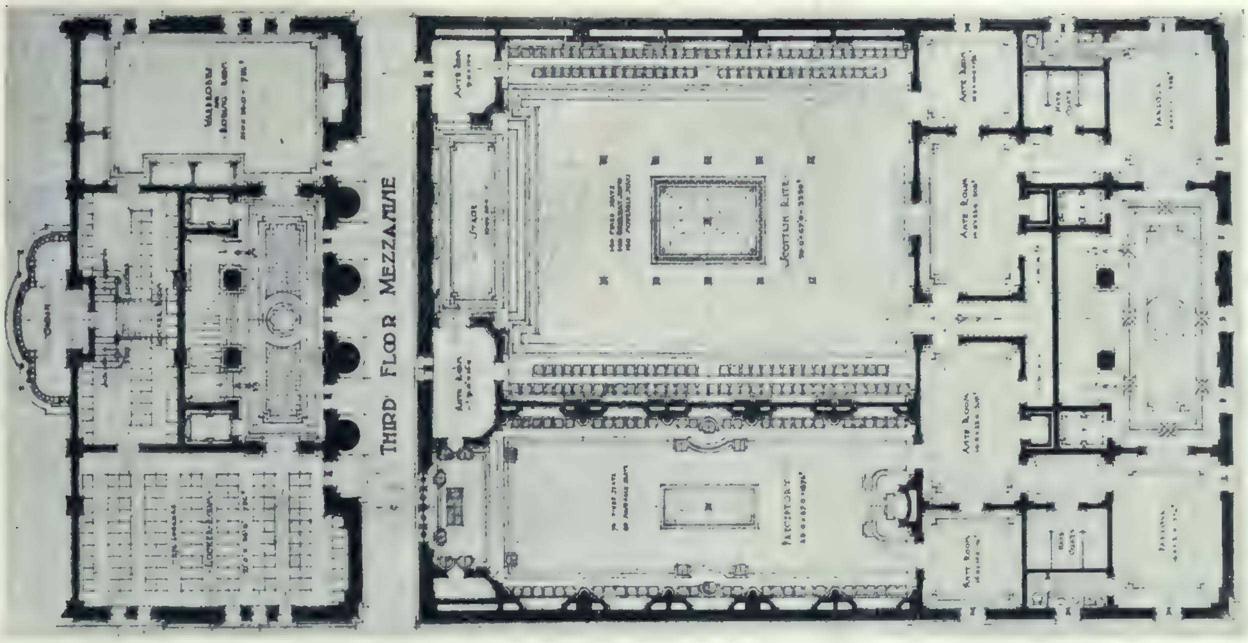


GALLERY FLOOR.

WINNING DESIGN.

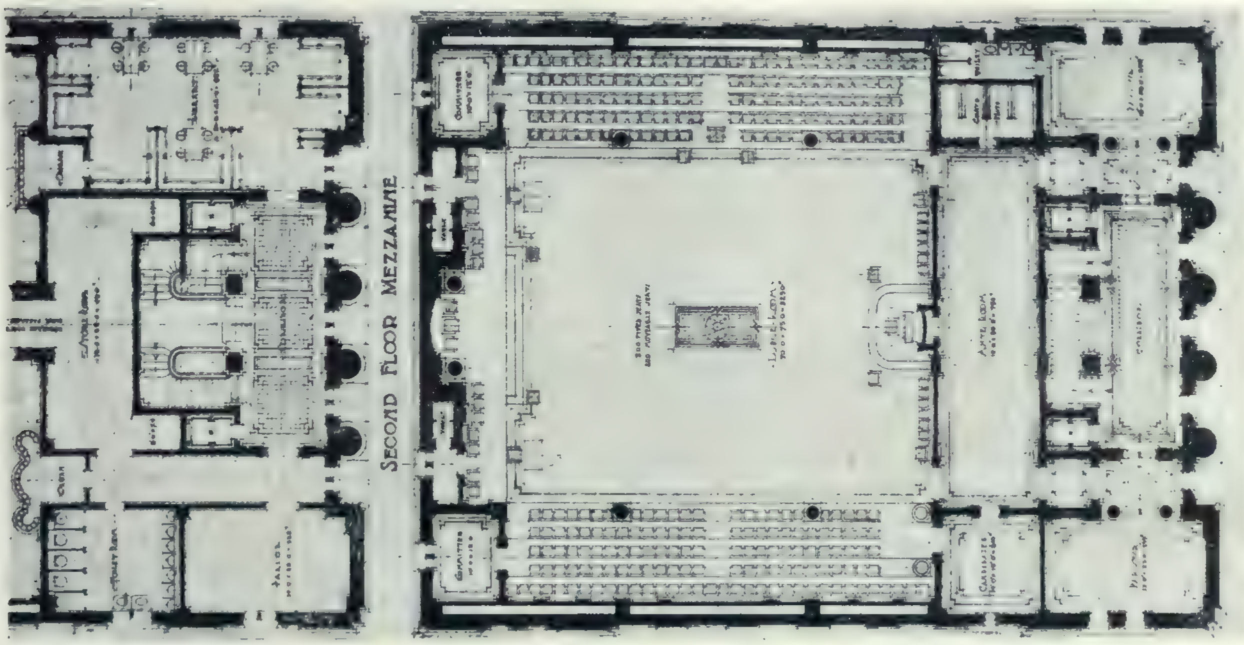
MASONIC TEMPLE, TORONTO, ONT.

H. P. KNOWLES, ARCHITECT.



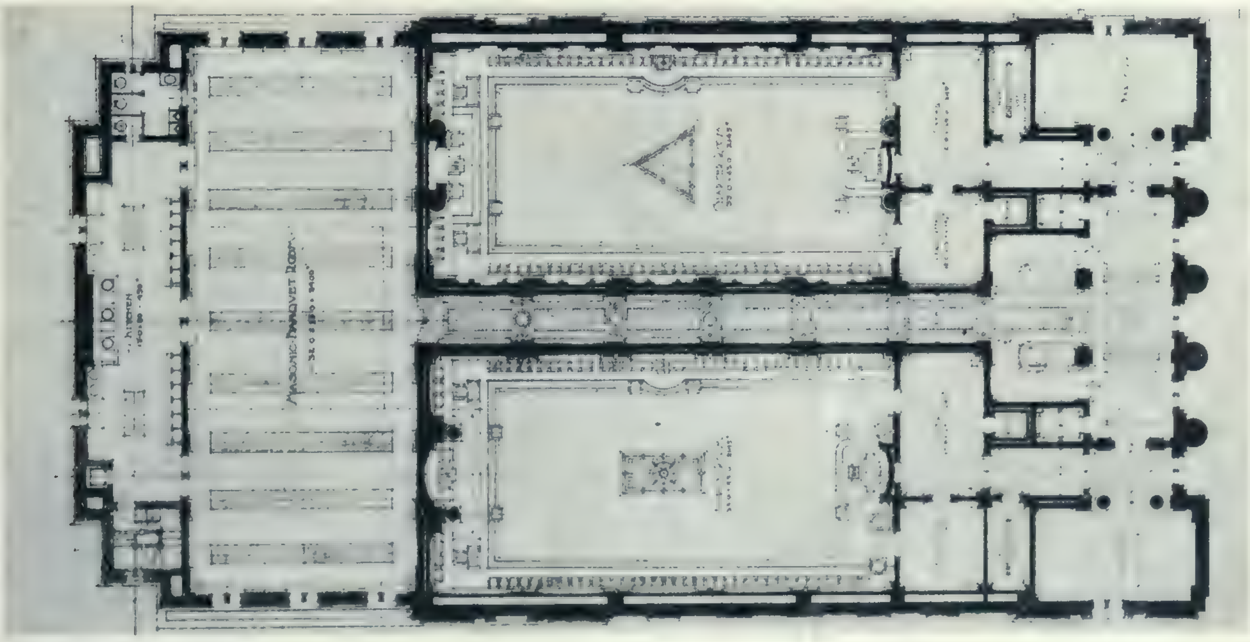
FOURTH FLOOR.

H. P. KNOWLES, ARCHITECT.



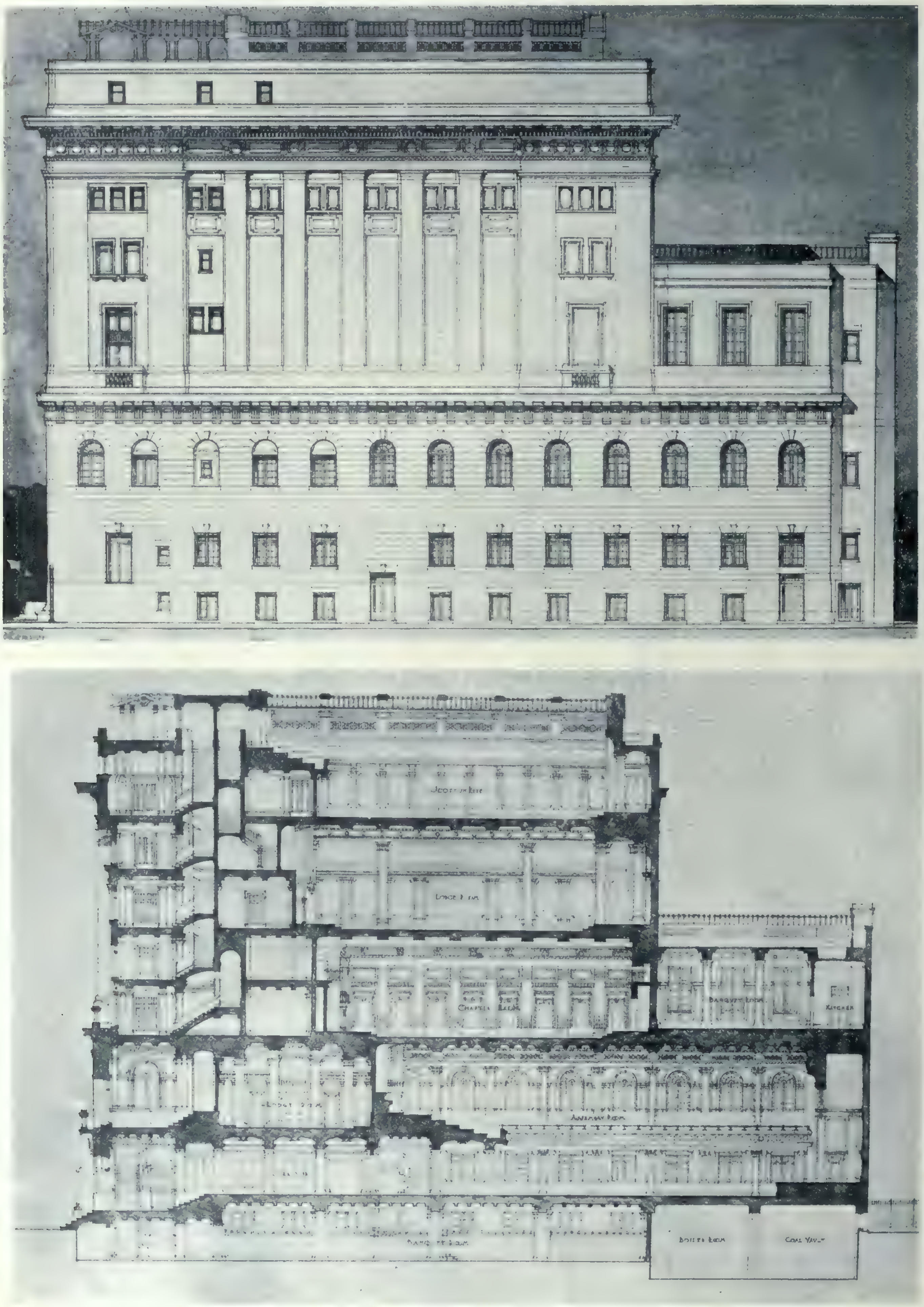
THIRD FLOOR.

MASONIC TEMPLE, TORONTO, ONT.



SECOND FLOOR.

WINNING DESIGN.

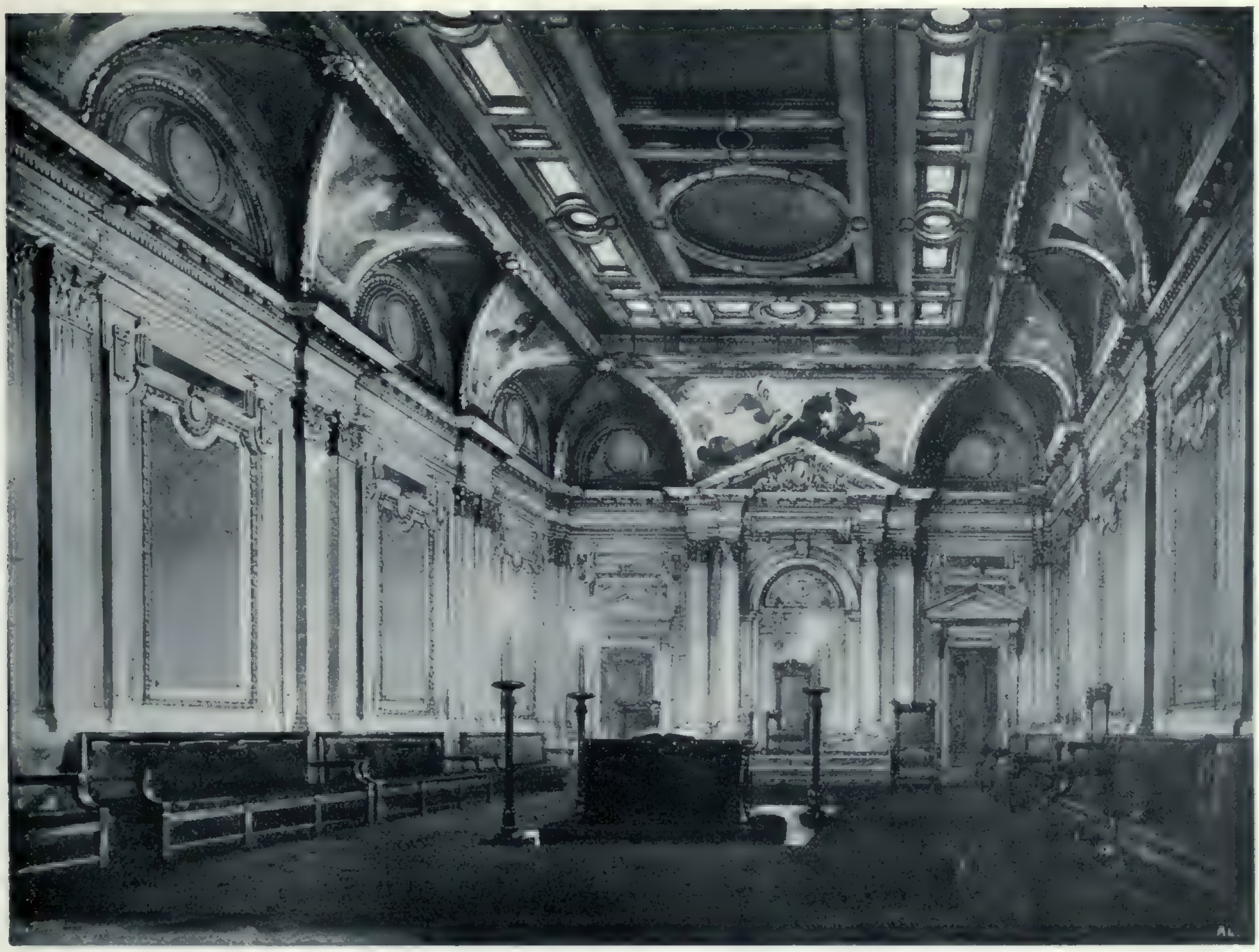


WINNING DESIGN.

SIDE ELEVATION AND SECTION.

MASONIC TEMPLE, TORONTO, ONT.

H. P. KNOWLES, ARCHITECT.



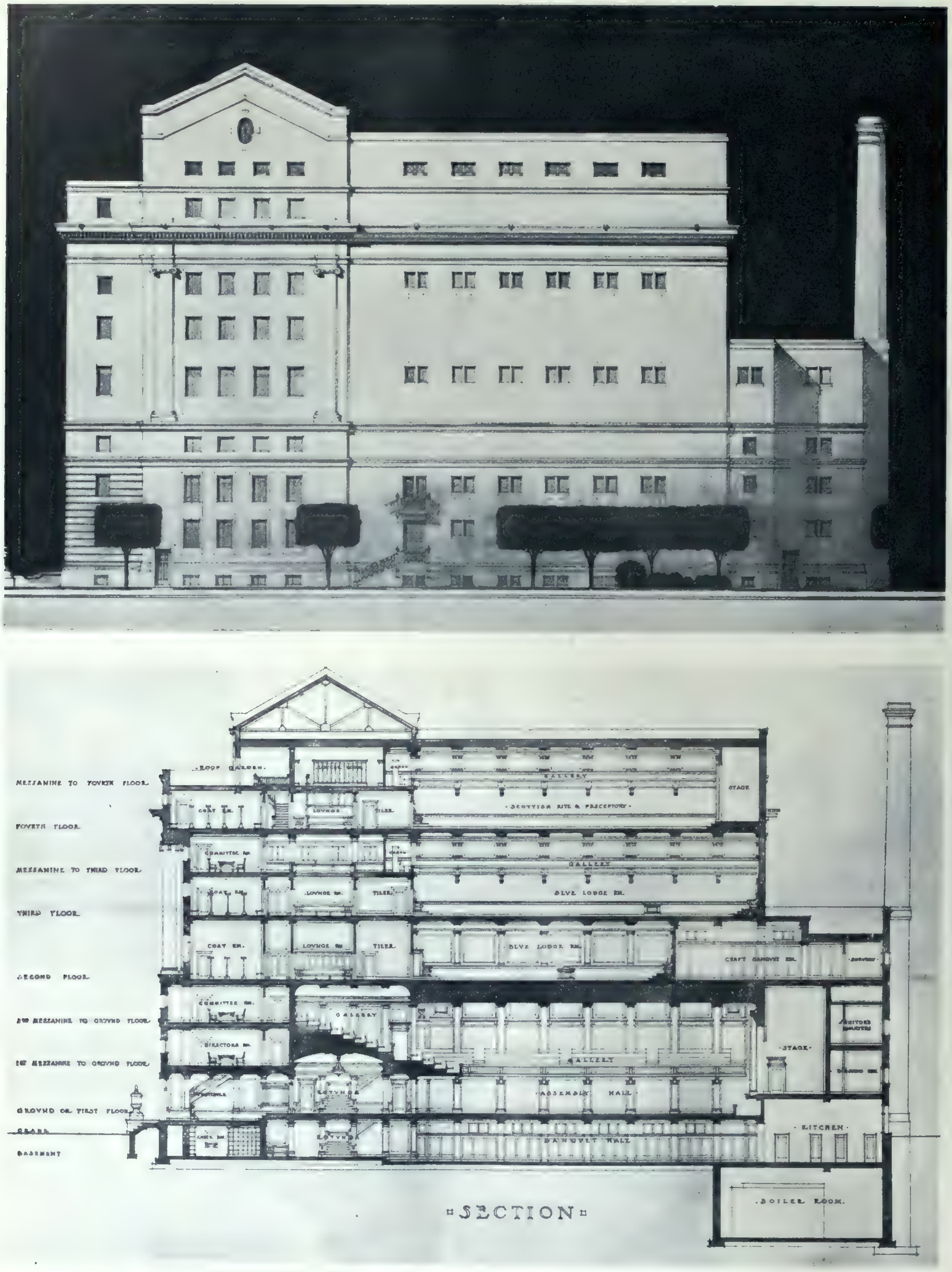
SCOTTISH RITE ROOM, WINNING DESIGN.

level (see sections and first floor plan) in order that additional height and dignity may be given to this entrance hall. On either side of the centre of this hall is a passenger elevator of the overhead electric traction type, which eliminates all elevator machinery in the basement and requires only a small motor room on the roof.

On the centre axis leading directly to the large assembly hall is a broad corridor 12 ft. wide and to the left and right before entering the main room are openings leading to the lounging rooms, coat rooms, toilet rooms, etc., for both men and women. These rooms are large and conveniently arranged to care for large crowds and after crossing the entrance hall no contact whatever is had with the Craft members using the upper floors—the elevators and staircases being arranged for the exclusive use of the members. The two flights of gallery stairs are placed within the assembly room, and one of them extends down to the banquet hall in the basement. Two additional staircases are provided for emergency in the gallery on both north and south sides at the stage end of the room. In addition to the main entrances to the assembly room, six additional emergency exits are provided, three to each side, all opening directly to the side driveways. Fixed seats, liberally arranged, provide for 1456 sittings, which with the additional sittings on the platform elevated 3 ft. above the floor level, make the required 1500 seats. This room is 99 ft. long to the back wall of the platform, and is 76 ft. wide and 31 ft. 6 in. high. Ample space is furred off from the side walls to provide for a supply of fresh air and for the exhaust ducts leading to the roof fan house. The treatment of this room is simple and dignified, with an order of pilasters around the walls, and a deeply panelled ceiling. Attention is particularly called to the natural lighting of this room.

On the gallery floor is found space for the smallest lodge room, accommodating 150; also the necessary rooms for the Board of Directors. These latter rooms are easily reached from the main entrance, as they are at the head of the north staircase one flight up.

On the second floor is a lodge room and a chapter room, each accommodating 250. A large toilet room for these two rooms is placed on the mezzanine directly over the ante rooms as shown. Between these rooms on the second floor is a corridor leading directly into the Masonic banquet room. This room is the full width of the building with large windows at either end and a kitchen at the rear. Dotted



SECOND PRIZE DESIGN.

SIDE ELEVATION AND SECTION.

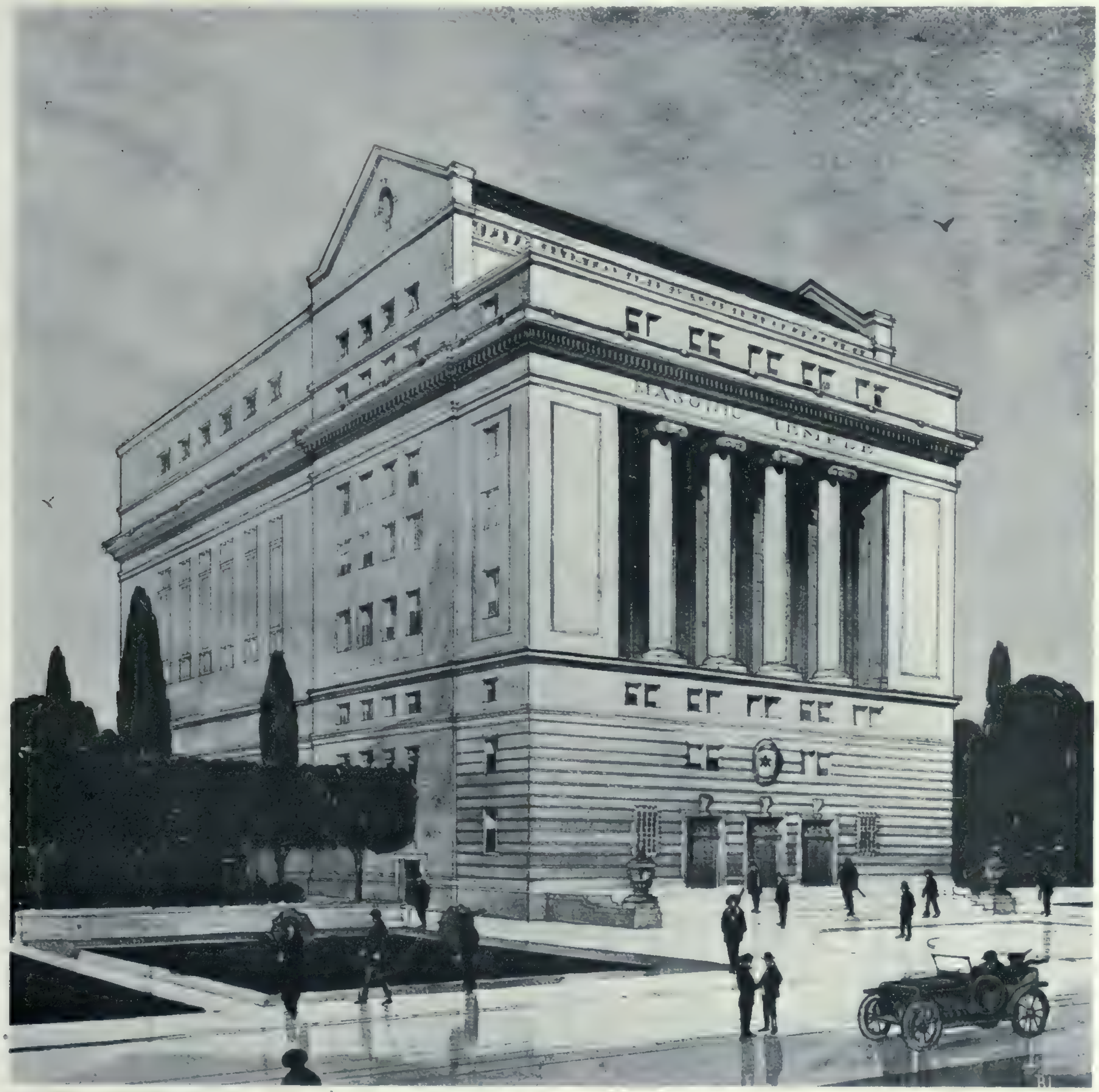
JOHN M. LYLE, ARCHITECT.

MASONIC TEMPLE, TORONTO, ONT.

lines indicate three possible divisions with sliding partitions, each of which may be served through an independent kitchen entrance. A staircase leads down from the kitchen to the rear yard and tradesmen's entrance. Dumbwaiter, range, vent flues, refrigerators, toilets, etc., are all indicated. The second story mezzanine contains the library on the north side, a large parlor or committee room on the south side, and a storage space in the centre or dark portion.

On the third floor is the large lodge room capable of seating 500 on one floor; also commodious ante rooms, parlors, committee rooms, etc. The third floor mezzanine is used by the Preceptories and Scottish Rite bodies occupying the top or fourth floor, and here are placed the lockers, wardrobes, and robing rooms, and a private staircase leading to the ante rooms above.

The fourth floor is divided into two main rooms to be used by the Preceptories and Scottish Rite bodies. The larger room has a gallery at the rear extending back over the ante rooms 17 ft. and the full width of the room, and is reached by a broad stairway leading directly from the main room or from the ante rooms as may be desired. The main staircase extends to the roof; and over the front portion of the roof as indicated on the front and side elevations is placed a roof garden for the use of the Craft.



SECOND PRIZE DESIGN, MASONIC TEMPLE, TORONTO, ONT.

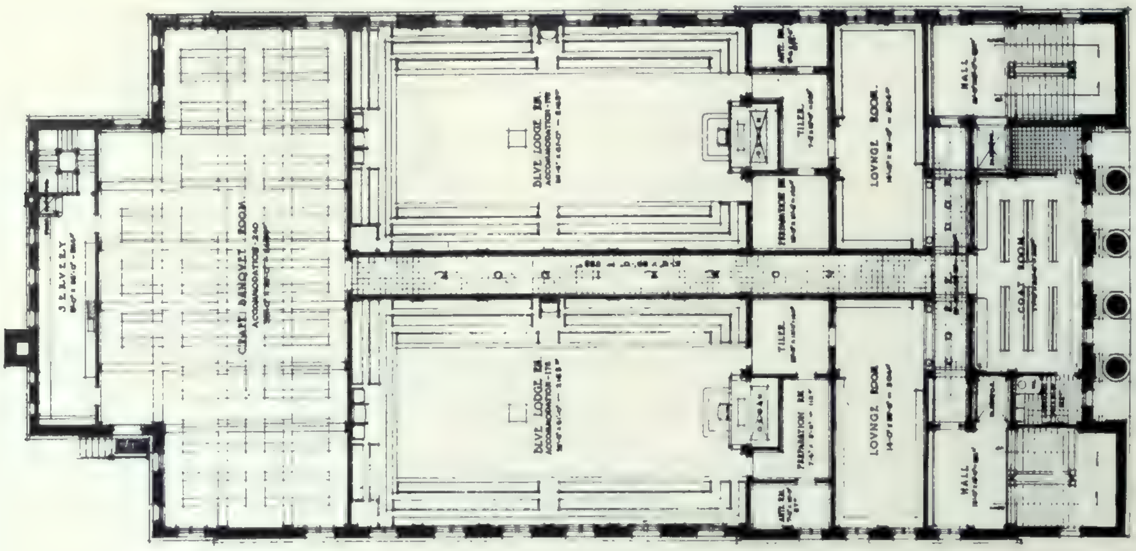
JOHN M. LYLE, ARCHITECT.

Exterior.—The exterior is intended to indicate simplicity, dignity and solidity; it is simple and pure in design; classic in treatment and monumental in its mass; its great scale and broad wall surfaces lend dignity; and the mas-

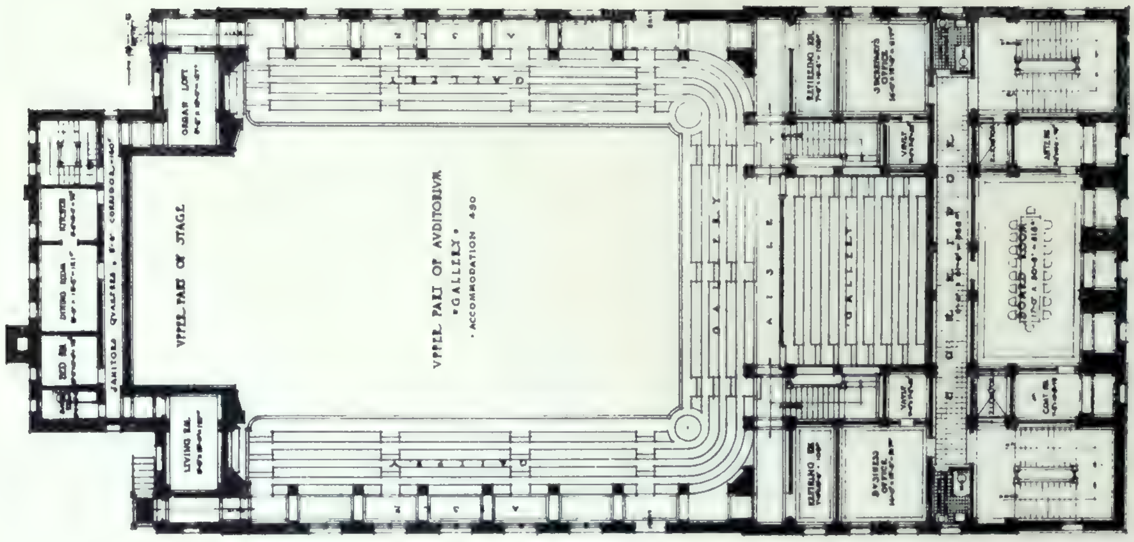
SECOND PRIZE DESIGN.

JOHN M. LYLE, ARCHITECT.

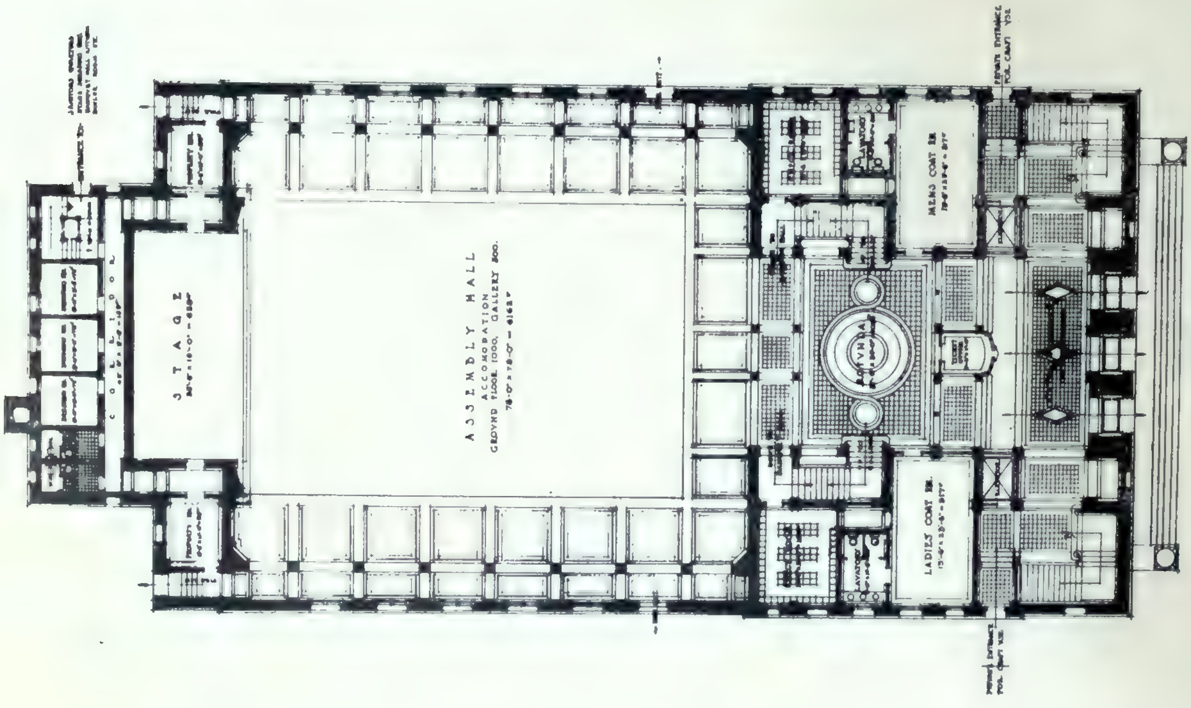
MASONIC TEMPLE, TORONTO, ONT.



SECOND FLOOR PLAN.



MEZZANINE FLOOR PLAN.


ENTRANCE TO JANITORS QUARTERS
STAGE
CORRIDOR
PROPERTY RM
PROPERTY RM
ASSEMBLY HALL
ACCOMODATION
GROUND FLOOR 1000, GALLERY 500.
ROTUNDA
MENS COAT RM
LADIES COAT RM
LAVATORY
PRIVATE ENTRANCE FOR CRAFT USE
PRIVATE ENTRANCE FOR CRAFT USE

FIRST FLOOR PLAN.

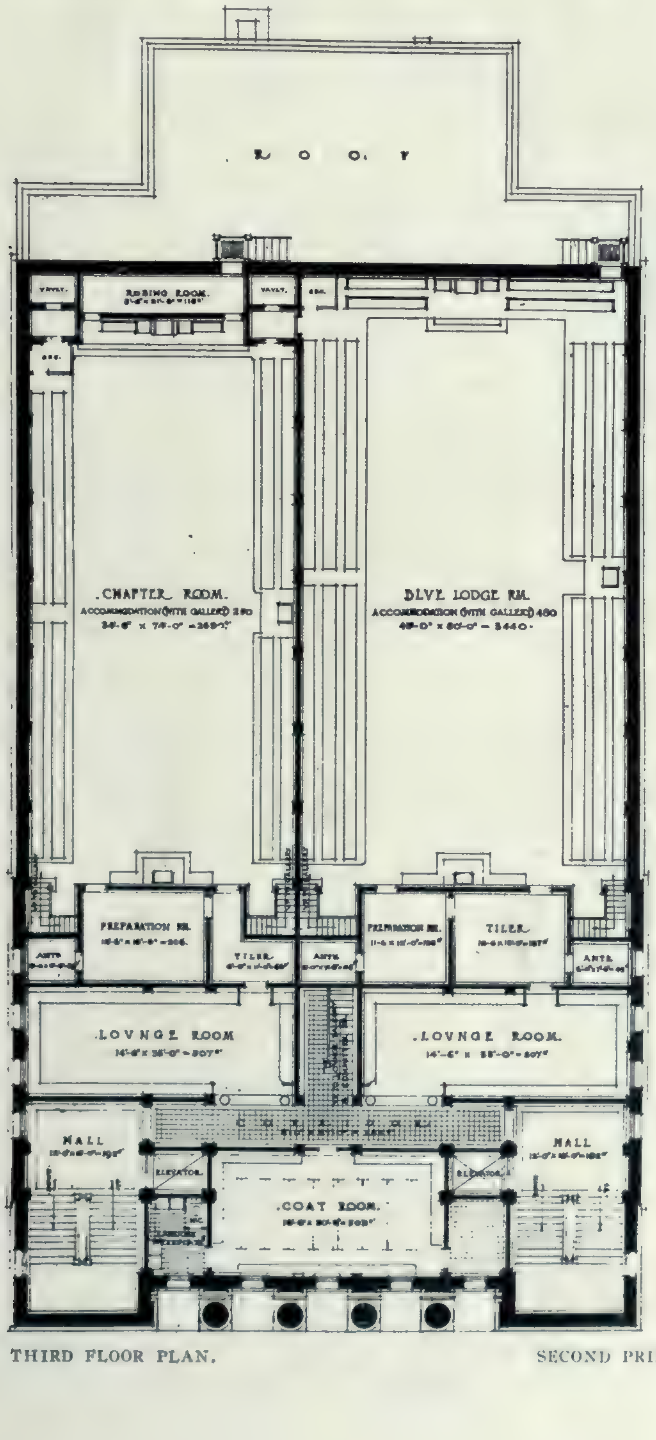
siveness of the columns, its broad blank pavilions and high base combine to give this facade an appearance of strength. Its internal divisions are clearly indicated on the exterior: the great assembly hall occupies the lower or base portion of the structure; while the other Masonic divisions occupy the upper portion; the division being marked by the cornice over the first story; and even without the aid of the two coats of arms flanking the main entrance, the beholder must easily recognize the purpose for which this building is intended.

It is proposed to execute the base course in granite; the entire first story on the front and two sides in plain ashlar buff-colored limestone; the upper part in a buff or cream-colored rough textured brick, with the columns, cornices and mouldings in terra cotta.

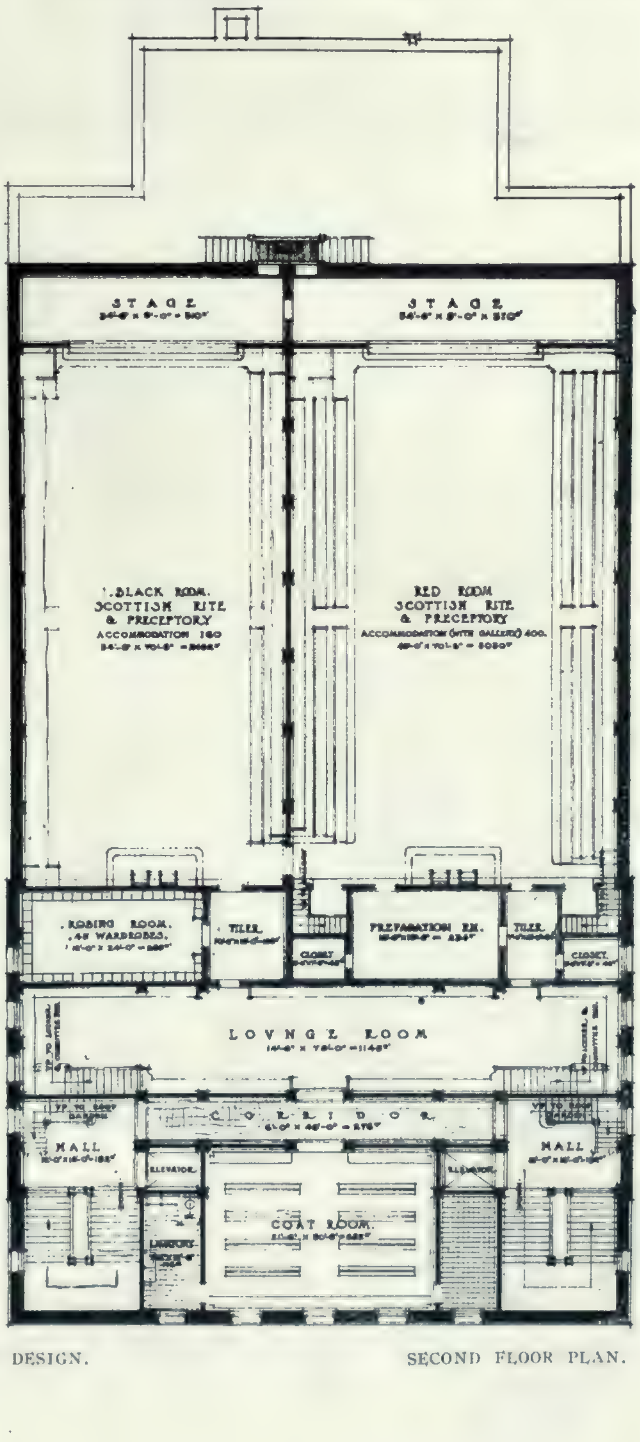
Heating.—The building is heated by a low-pressure steam heating apparatus of ample capacity to heat the building. Three boilers of approximately 75 h.p. each are indicated in the boiler room, one of which is intended as a spare unit; and additional space is left for yet another unit should necessity require it.

In the pump room are shown vacuum, house and sump pumps. Direct radiators, automatically controlled, to be placed under all windows, and to be enclosed in all principal rooms. Filtered air to be supplied and foul air exhausted through a system of ducts and flues, concealed in the walls and partitions of all lodge, chapter, assembly and other principal rooms; also in the toilet rooms throughout the building. Fans, motors, tempering coils, filtering chambers, etc., are located in the fan room in the basement, also in the fan house on the roof.

The following terms are taken from the pro-



THIRD FLOOR PLAN.

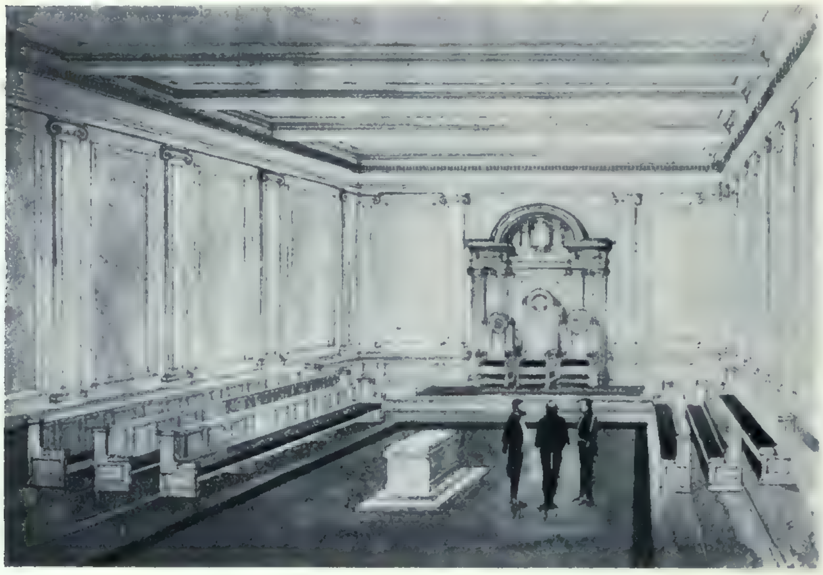


SECOND PRIZE DESIGN.

SECOND FLOOR PLAN.

gram submitted to each of the competitors:

Preparation and Delivery of the Competitive Drawings.—1. The drawings submitted shall be made to a scale of one-eighth of an inch to the foot and shall comprise the following only:—



BLUE LODGE ROOM. SECOND PRIZE DESIGN.

(a) Floor plan of each storey (and roof if desired). (b) Sufficient sections to clearly illustrate the scheme proposed, including treatment of principal rooms. (c) East, north and south elevations. (d) A perspective drawing showing principally the east frontage of the building, with the horizontal line taken ten feet above the ground level. This drawing may be executed in any medium and in whatever manner the competitor prefers. Any competitor may submit further perspective sketches illustrating characteristic treatment of the various lodges and assembly room.

ASSEMBLY HALL, SECOND PRIZE DESIGN.

2. The scale drawings shall be made in India ink or monochrome on white paper, delivered flat in a portfolio, and not framed or mounted. The elevations may be washed in with cast shadows. All rooms and corridors shall be figured for dimension and area. The main titles shall be in Roman capitals, and all other lettering, notes and figuring shall be in plain block type. The size of each sheet of drawings shall approximate thirty-two by thirty-six inches—this to include all borders, titles, lettering, etc.,—the portfolio to be made just large enough to comfortably hold them.

3. The competitor shall submit with the drawings a typewritten unsigned statement, briefly describing the arrangement of the building, its construction and materials, and the type of heating and ventilating proposed, with an explicit statement of the rate at which the work is estimated to cube (exclusive of equipment) together with a guaranteed computation of the number of cubic feet in the building properly worked out, with description as to what method is followed in working out the cubical contents.

4. The drawings must have no mark or device of any kind, nor any hand writing, or other means of identification. With each set of drawings is to be enclosed a plain blank sealed white envelope containing the name of the author, together with a statement that the designs and drawings have been prepared in his own office, under his own supervision. Envelopes will not be opened until after the award has been made.

5. Any infringement of these regulations or disclosures of identity may be held sufficient ground for the exclusion of the drawings from the competition.

6. The drawings and the descriptive statement shall be enclosed in a plain blank sealed package, which, together with the blank envelope, shall be again enclosed in a second sealed covering addressed and delivered between 9 a.m. and noon on the 20th of January, 1914.

Accommodation, Etc.—It is to be understood that the data given below is merely approximate, also that the location of the various rooms is not arbitrary. It is to be observed, however, that, as the large hall and banquet room are expected to be used for purposes of revenue, they be so situated that their occupancy will not bring the persons using them into the portions of the building devoted more particularly to the purposes of the Craft. It is to be observed, also, that the apartments having the fewest occupants and most infrequent use, should be placed highest up, in order to reduce, as much as possible, expense in running the elevator or elevators. A roof garden, partially covered, may be suggested.

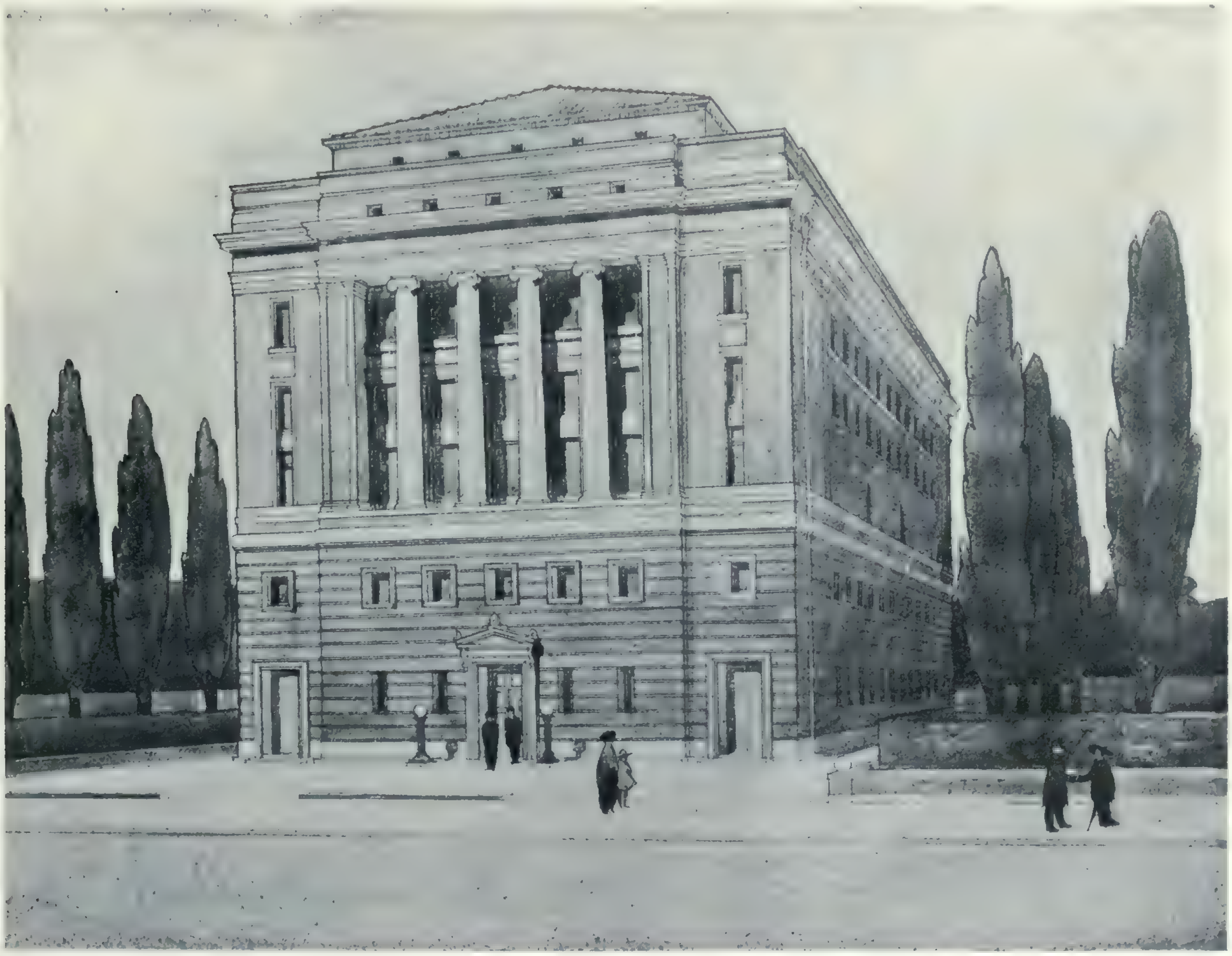
The site upon which it is contemplated to erect the building is at No. 16 Spadina Road, having a frontage of 100 feet and a depth of 198 feet, but a boulevard or parking of 25 feet at the front must be reserved, free of encroachments, though a driveway may approach the entrance or entrances over this reservation.

As the flankages may be exposed for some years to come, the side elevations should receive due study. It is required that sufficient space be reserved for a driveway on the north side, suitable for automobiles or delivery wagons. On the south side only sufficient space need be provided for air, and a moderate amount of light in the event of an adjoining building being erected close to the building line. The building may be four or five stories in height in addition to the basement, but not necessarily the full height for the entire length of the structure. The structure should have fireproofed floors, roof and main partitions or divisions. A moderate-sized vault on each floor is required.

The promoters contemplate an expenditure of about $250,000.00 and the cost will require to be kept within ten per cent. of this amount, consistent with a building suitable for the purpose, characteristic in design, and of worthy material.

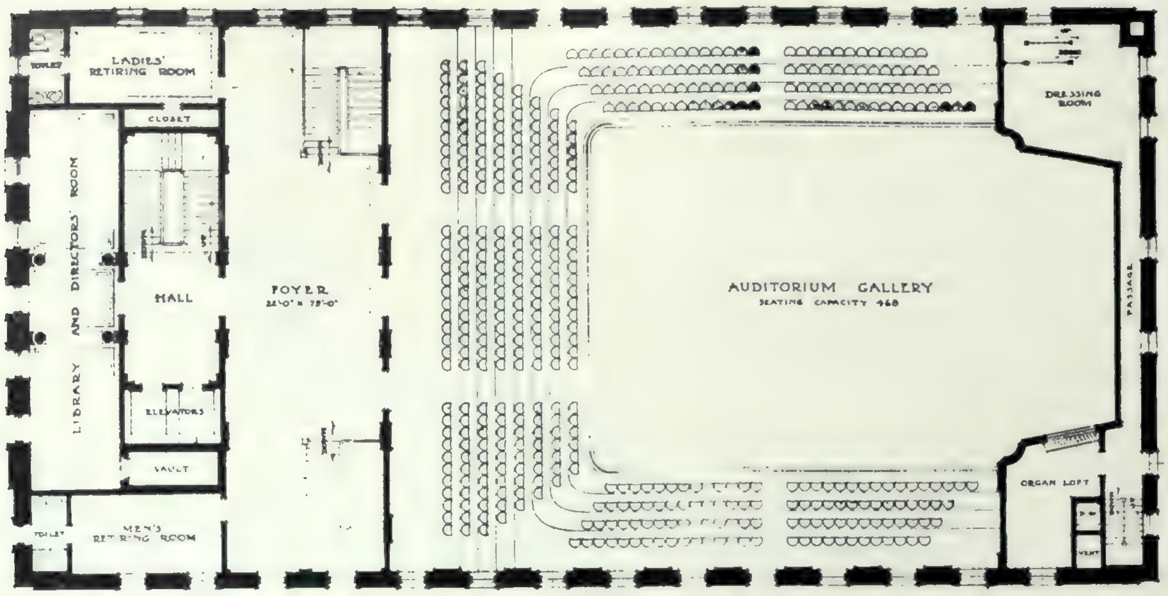
The following is a schedule of apartments required, which may be amplified, but not reduced in number.

Assembly room, 1500 persons; banquet or supper room for use in connection therewith, 500 persons; banquet room for Craft use, 250 persons; Blue Lodge room, 500 persons; Blue Lodge room, 200 persons; Blue Lodge room, 150 persons; Chapter room, 250 persons. The top floor to be devoted to Scottish Rite and Preceptory purposes in common. Two rooms will be required, one to accommodate 400 and the other 150. In connection with the above there will be committee rooms, lounge roms, lavatories, cloak rooms, etc. 400 lockers will be required on top floor or convenient thereto, also wardrobes and robing room. Business office will be required on lower floor with rooms for directors and secretary. It is also desired that there

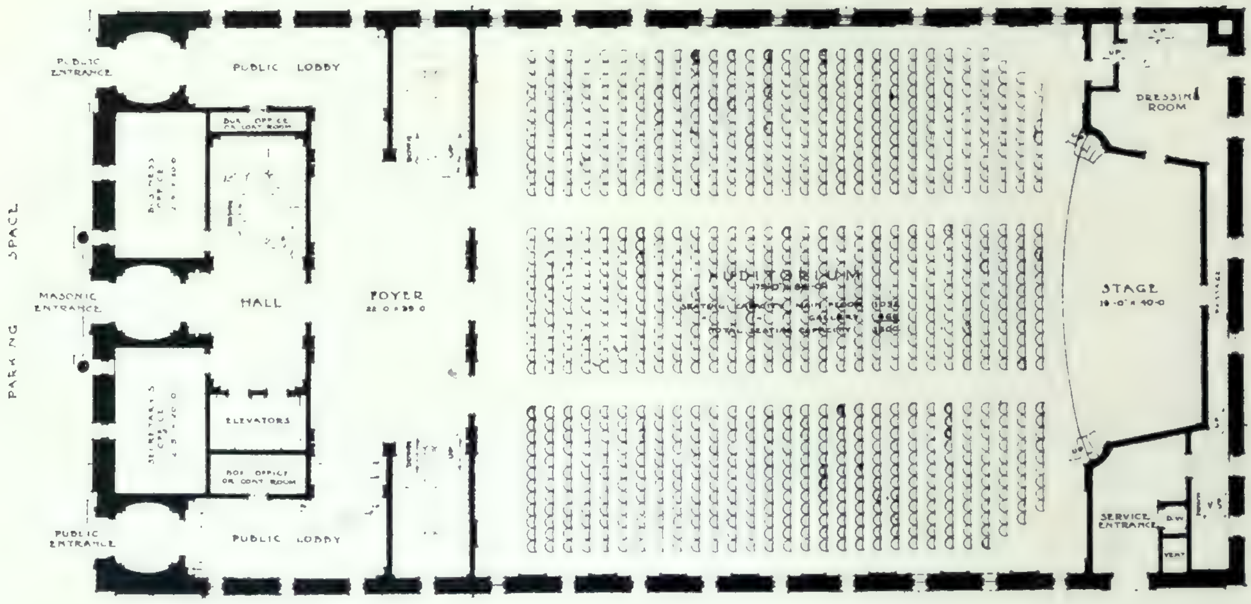


THIRD PRIZE DESIGN, MASONIC TEMPLE, TORONTO, ONT.

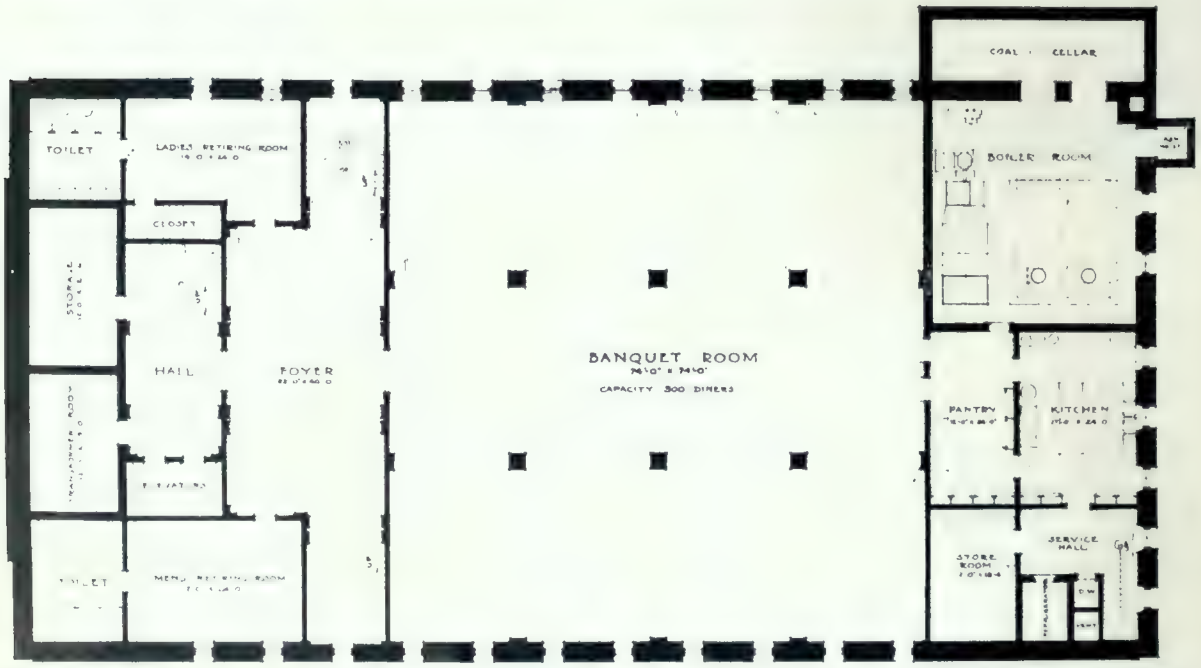
HUTCHISON, WOOD & MILLER, ARCHITECTS.



MEZZANINE FLOOR PLAN.



FIRST FLOOR PLAN.

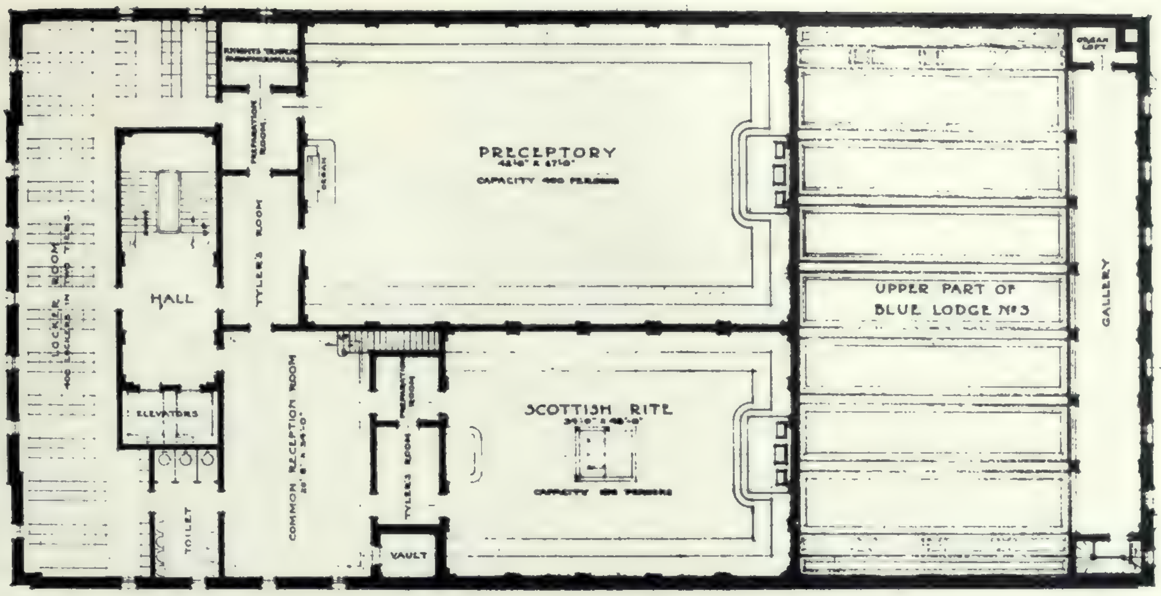


BASEMENT PLAN.

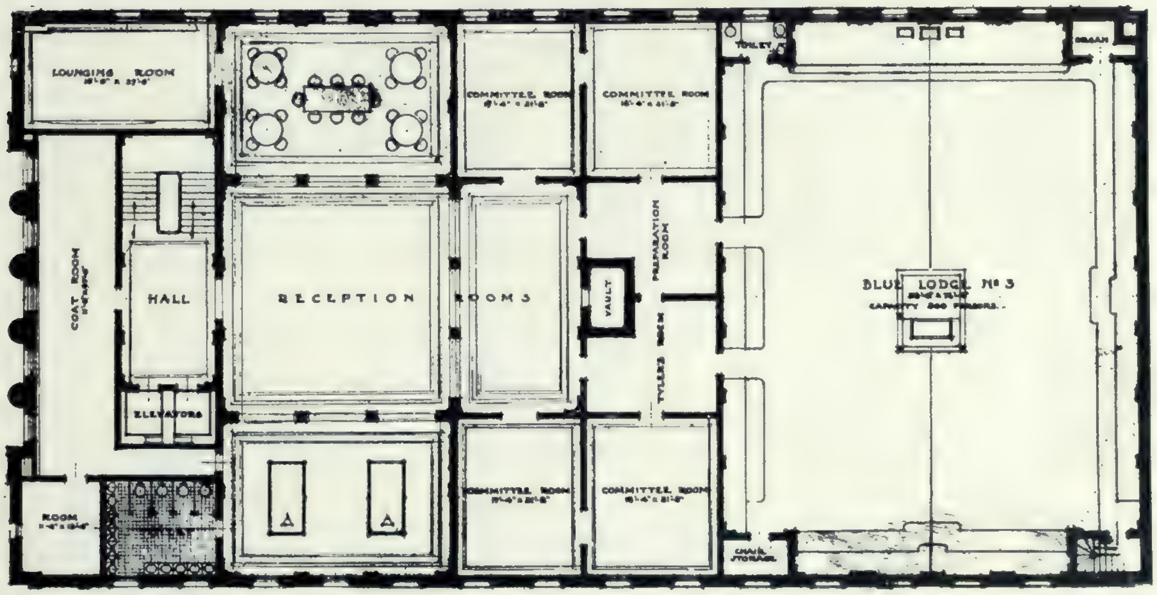
THIRD PRIZE DESIGN.

MASONIC TEMPLE, TORONTO, ONT.

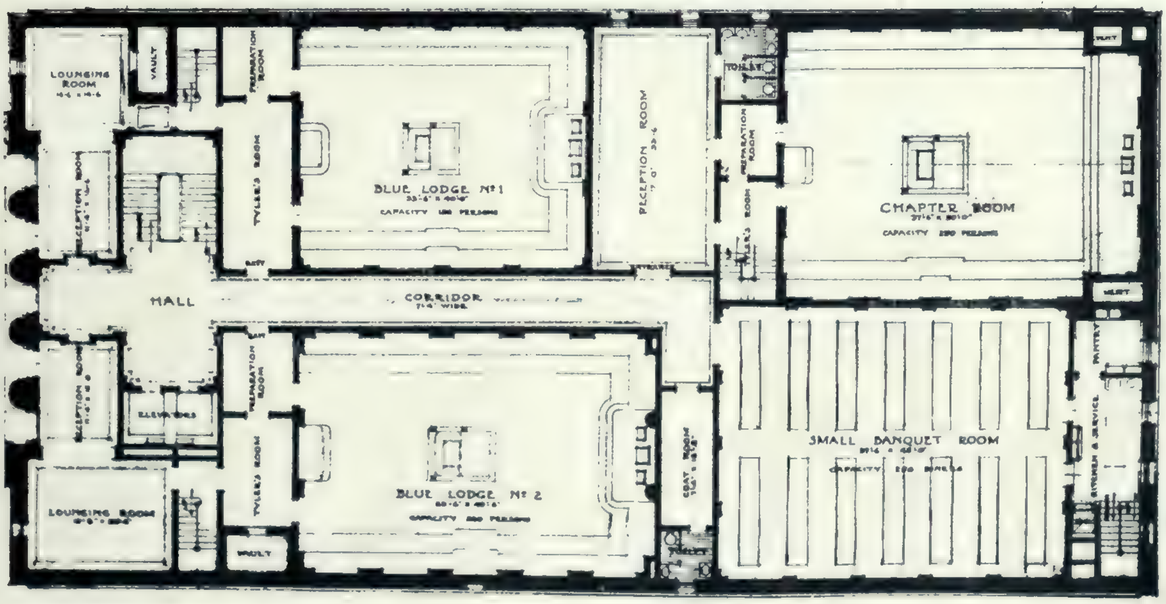
HUTCHISON, WOOD & MILLER, ARCHITECTS.



FOURTH FLOOR PLAN.



THIRD FLOOR PLAN.

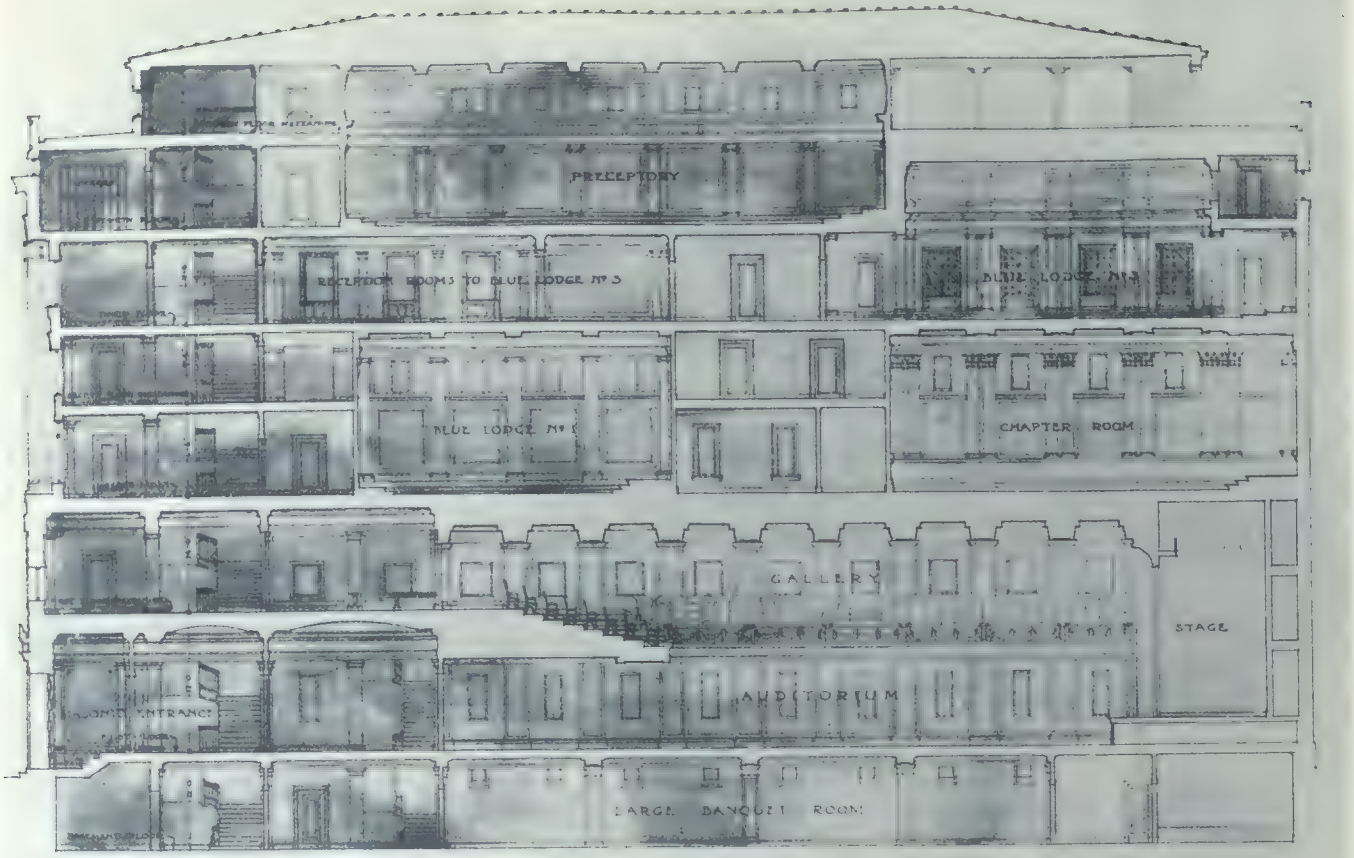


SECOND FLOOR PLAN.

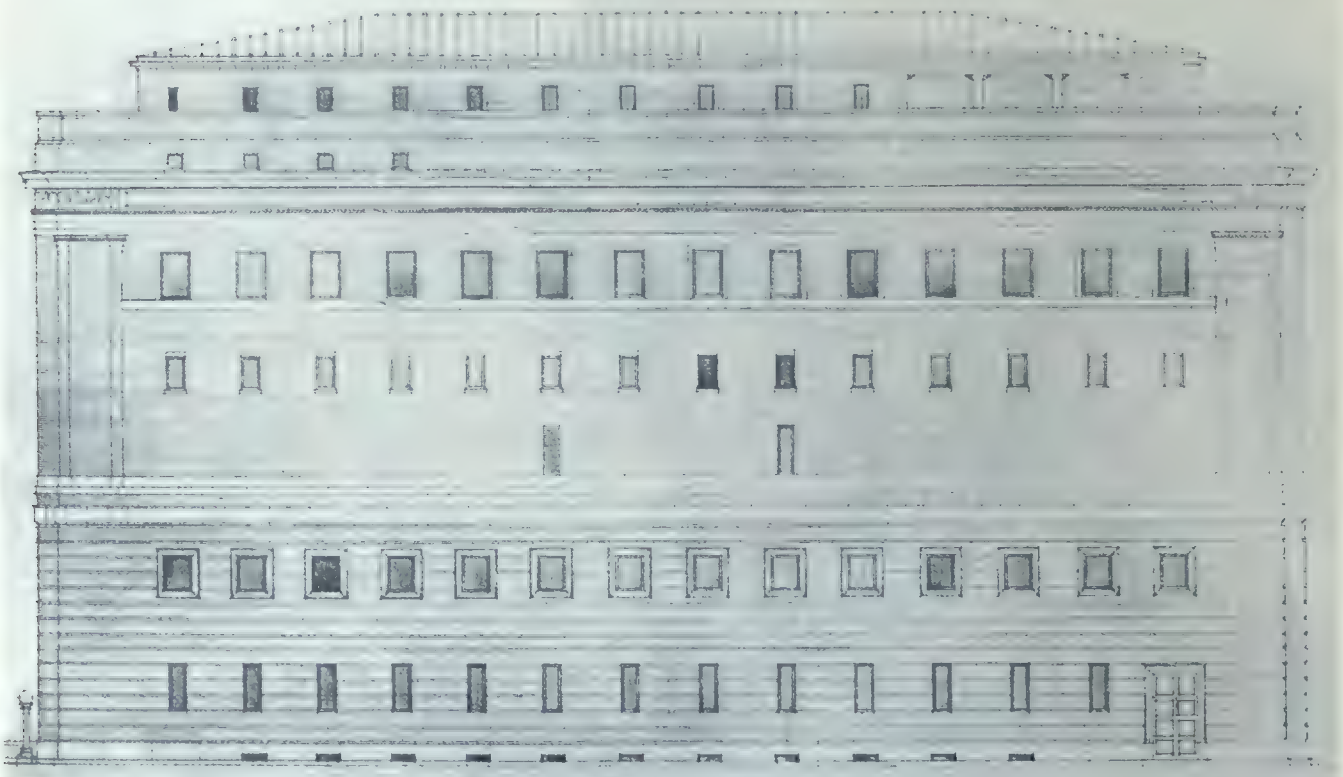
THIRD PRIZE DESIGN.

MASONIC TEMPLE, TORONTO, ONT.

HUTCHISON, WOOD & MILLER, ARCHITECTS.



LONGITUDINAL SECTION

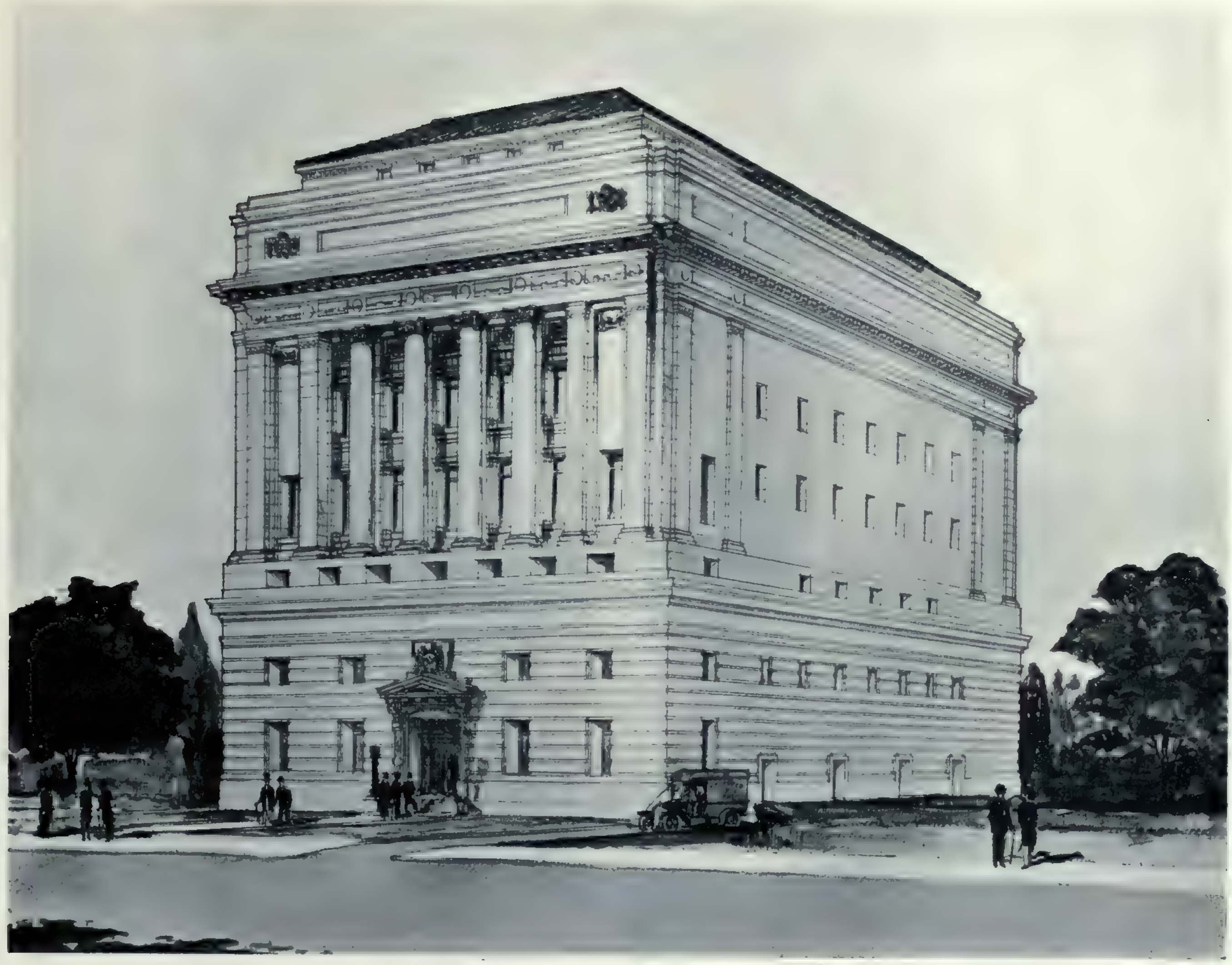


NORTH ELEVATION

THIRD PRIZE DESIGN.

MASONIC TEMPLE, TORONTO, ONT.

HUTCHISON, WOOD & MILLER, ARCHITECTS.



FOURTH PRIZE DESIGN, MASONIC TEMPLE, TORONTO, ONT.

A. W. GOULD & A. E. HARVEY, ARCHITECTS.

shall be some unallotted space for library or other purposes. Janitors' rooms must be provided.

It is intended to rent the assembly room for social purposes, including dances, assemblies, conventions, concerts, etc. Careful designing is necessary as it will be the only space rentable to persons outside the Craft. A stage or platform will be required. Adequate kitchen, stores, refrigerator, cloak, lavatory and retiring and other rooms must be provided. The assembly room is an important revenue producing feature of the building and the accoustic properties must be carefully provided for.

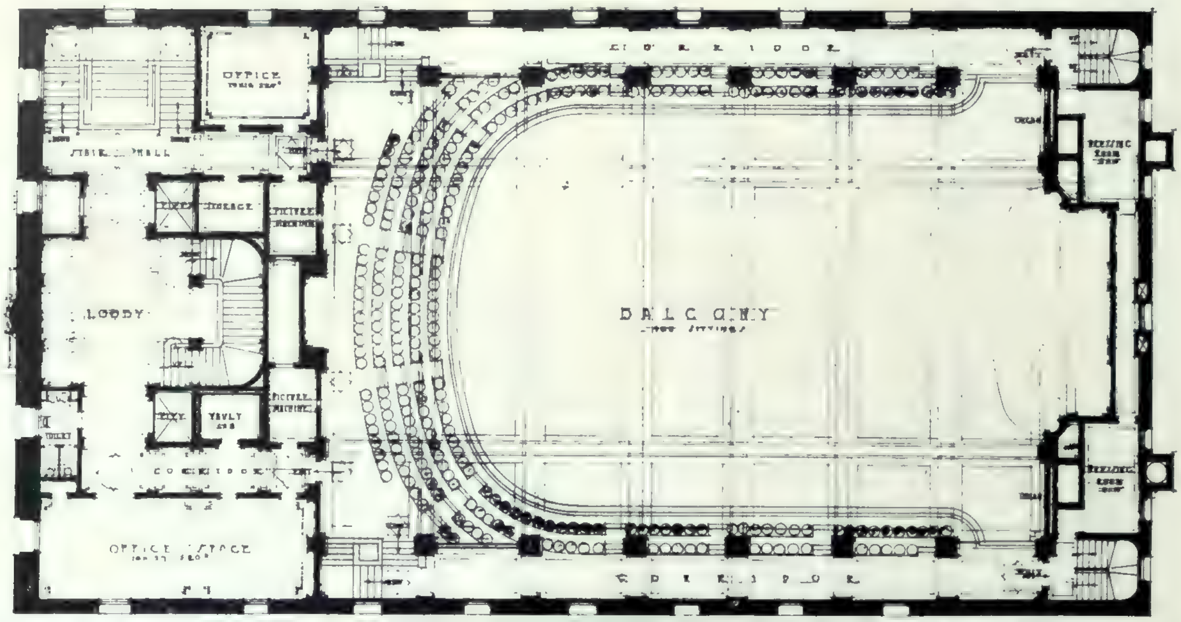
The Architect and the Work.—1. The architect to whom the promoters shall award the work, shall, if and as required by the promoters or any committee thereof, make such changes in plan and arrangement as shall be necessary to meet with the views of the promoters.

2. After the plans have been finally accepted by the promoters the architect shall prepare working drawings and specifications and shall supervise the work during the construction of the building.

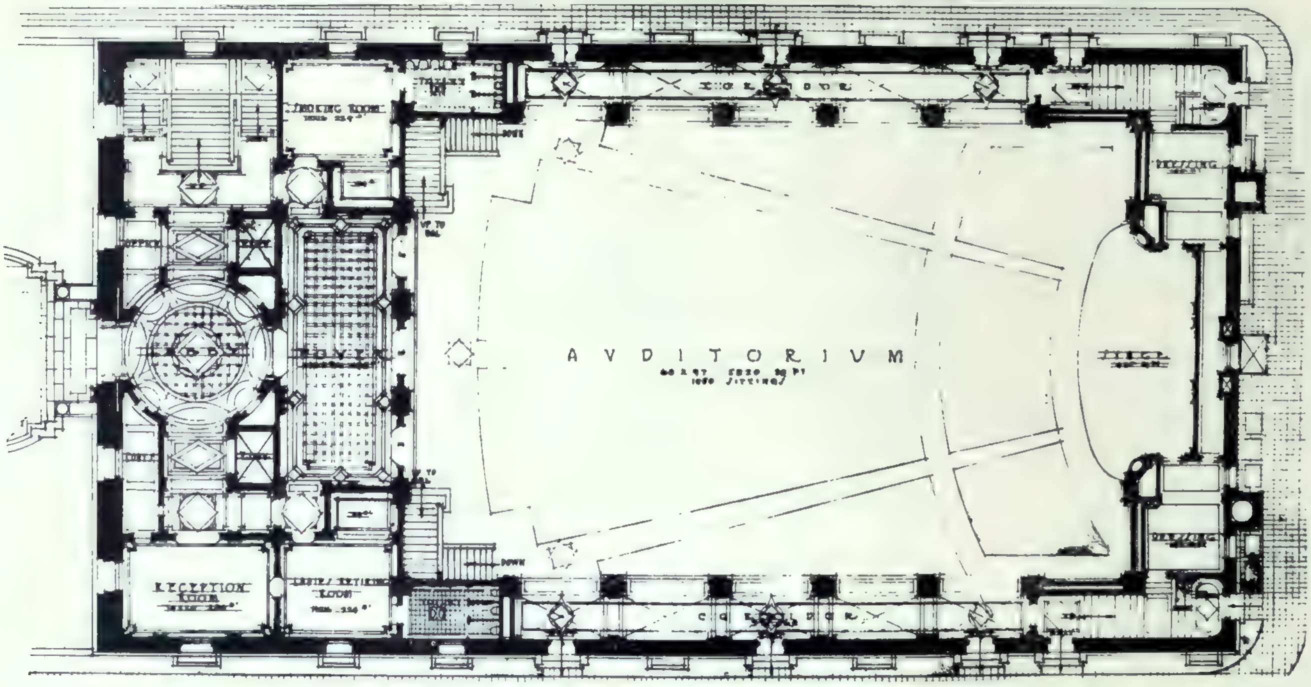
3. All drawings and specifications as instruments of service are to remain the property of the architect, but one record copy on tracing linen, or blue print of the plans, elevations and sections of the work as executed, to the scale of one inch to eight feet, shall be furnished free by the architect to the promoters when the works are completed together with a set of specifications appended to correspond with the works, including a correct figured plan of all the drains inside and outside the building, as carried out, all duly certified by him.

4. The architect shall appoint a thoroughly competent clerk of works, approved by the promoters. The architect shall regulate the duties of the clerk of works and shall have power to discharge him for cause. Such clerk of works shall devote his whole time to the job and shall be paid by the promoters.

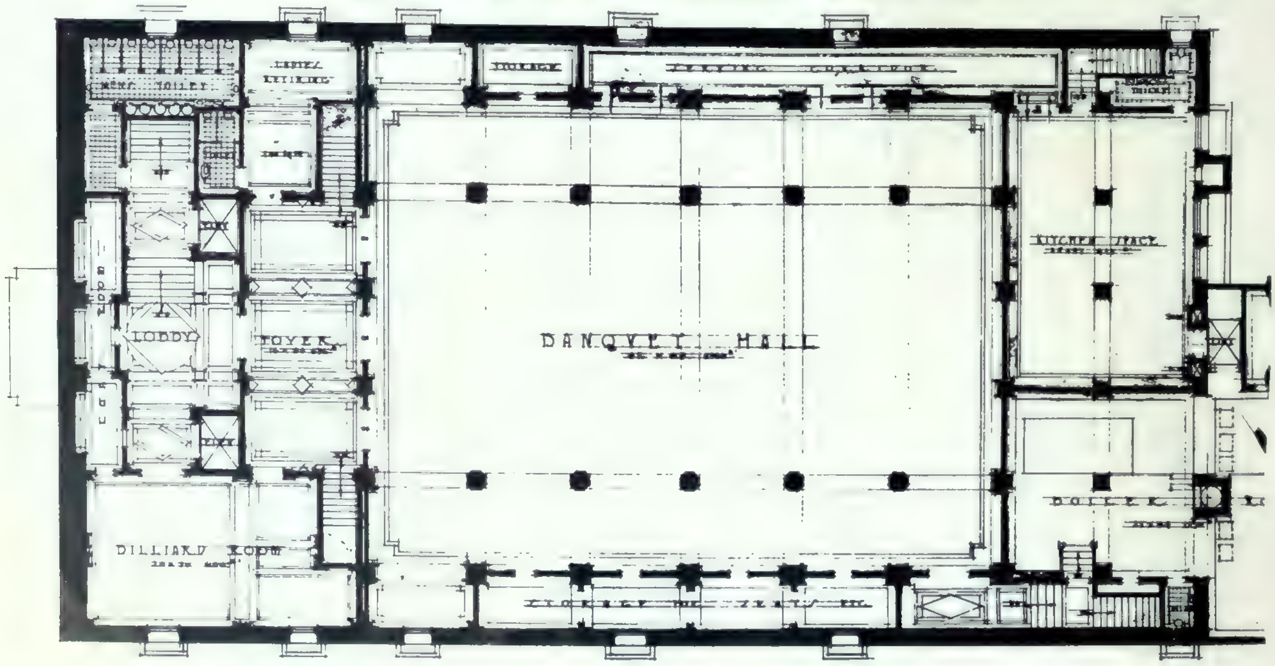
5. The architect shall appoint a qualified professional electrical, heating and ventilating engineer (not a contracting firm or a member of one) approved by the promoters. The fees of such engineer or engineers shall be paid by the architect out of his own commission.



FIRST FLOOR PLAN.



GROUND FLOOR PLAN.

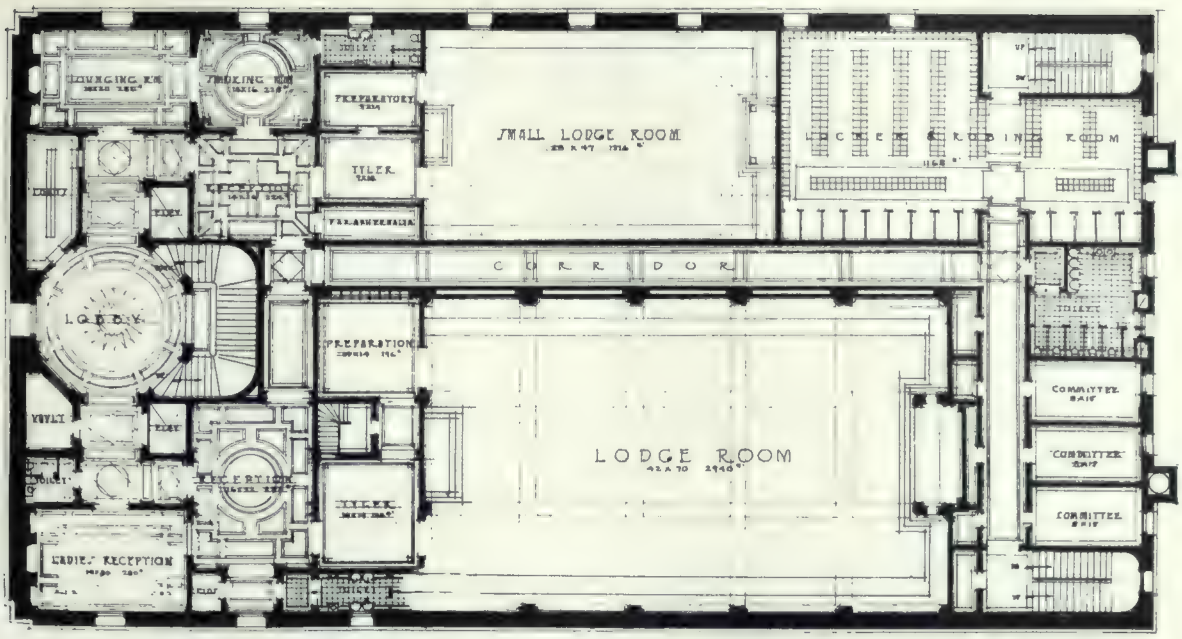


BASEMENT PLAN.

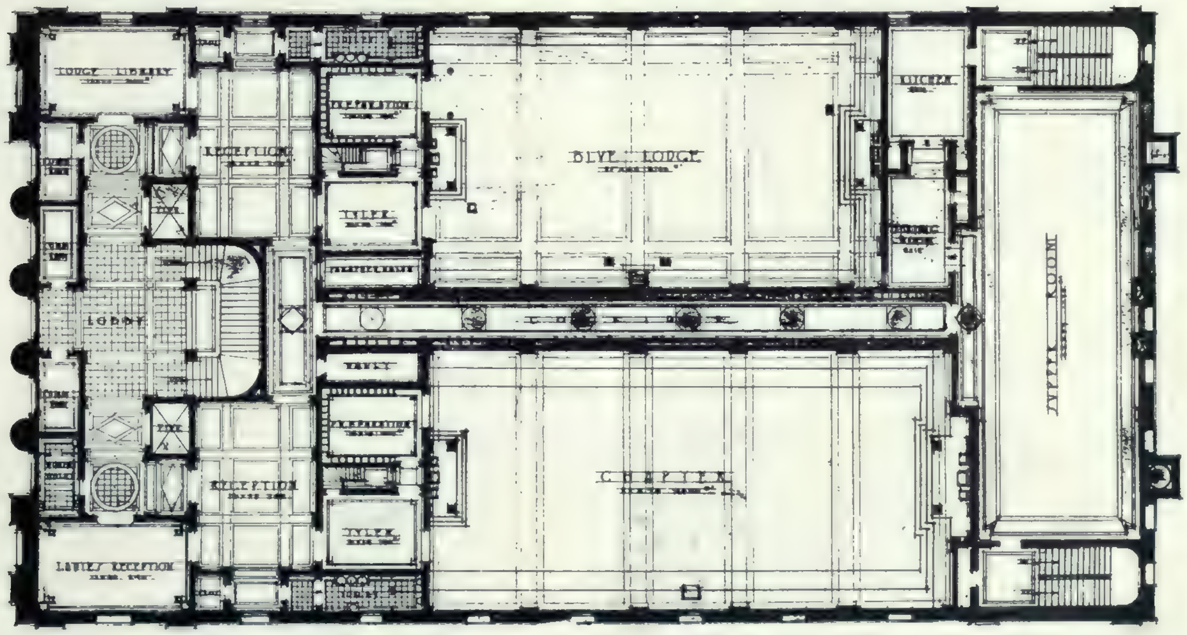
FOURTH PRIZE DESIGN, MASONIC TEMPLE, TORONTO, ONT.

GOULD
&
HARVEY,
ARCHITECTS.

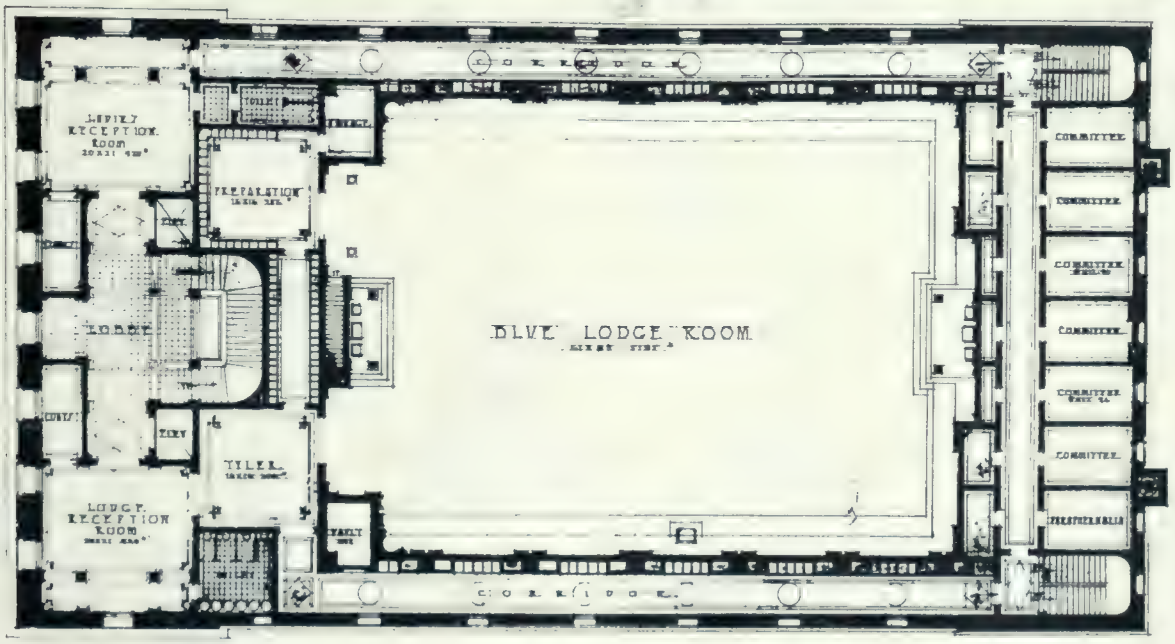
FIFTH
FLOOR
PLAN.



FOURTH
FLOOR
PLAN.

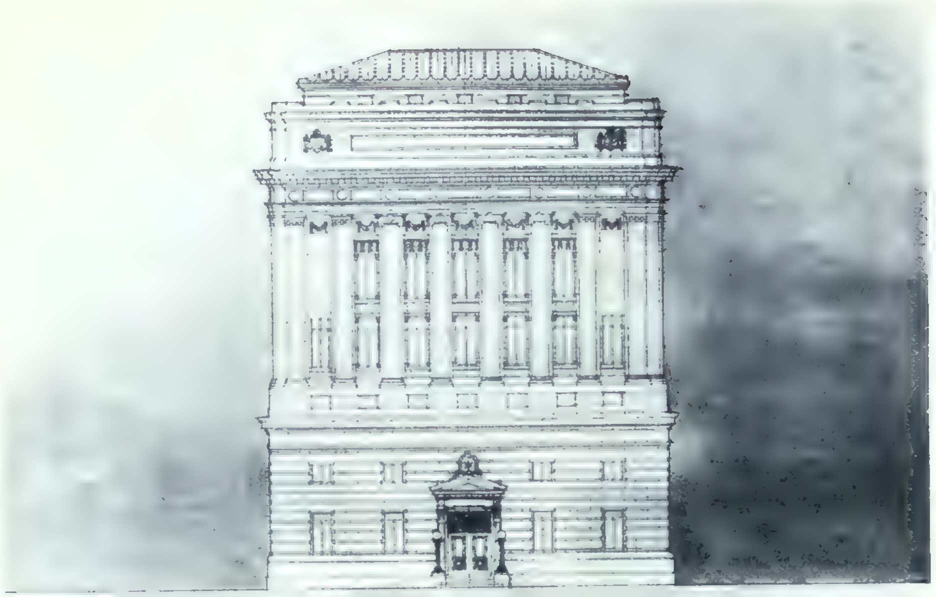


THIRD
FLOOR
PLAN.

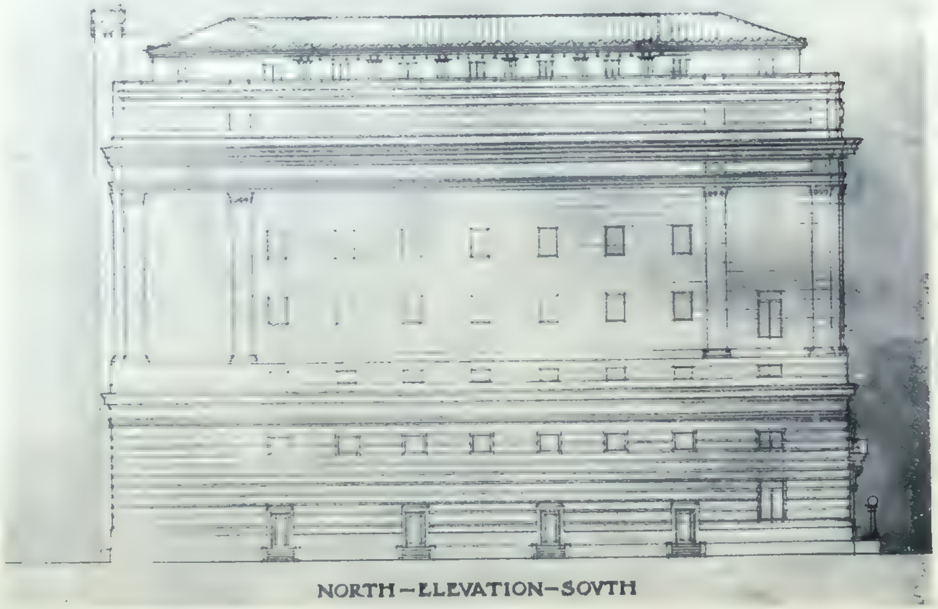


GOULD
&
HARVEY,
ARCHITECTS.

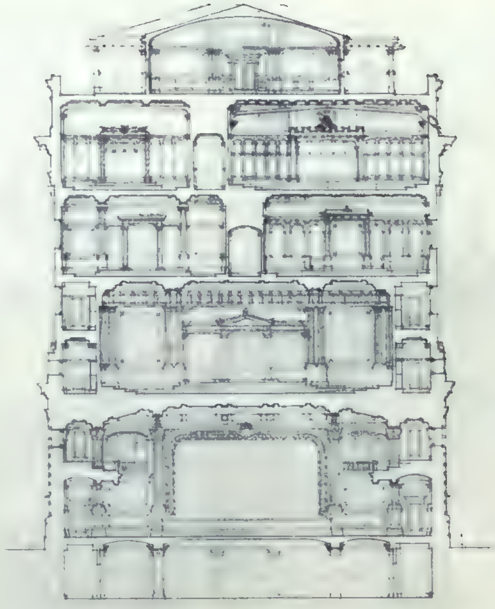
FOURTH PRIZE DESIGN, MASONIC TEMPLE, TORONTO, ONT.



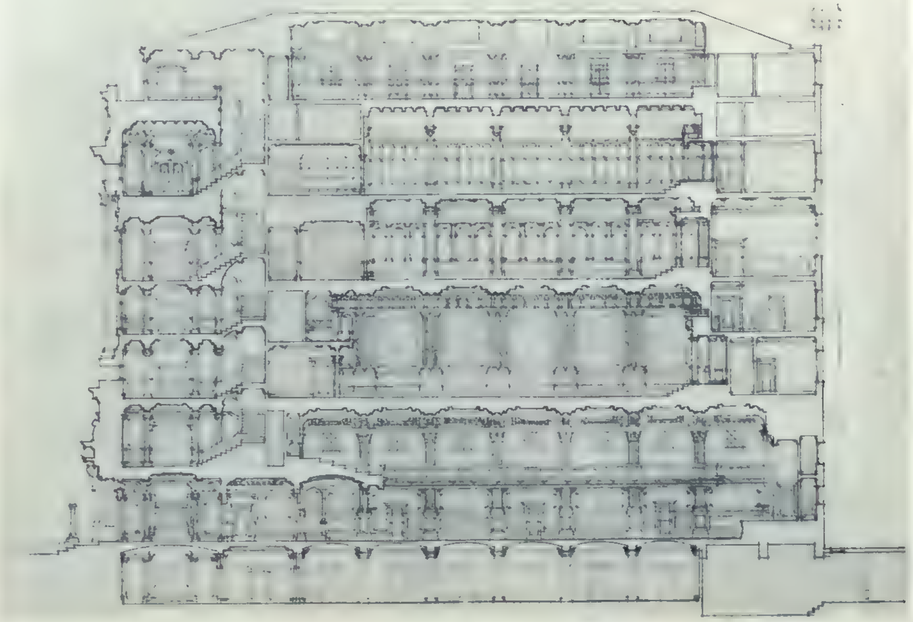
EAST ELEVATION



NORTH–ELEVATION–SOVTH



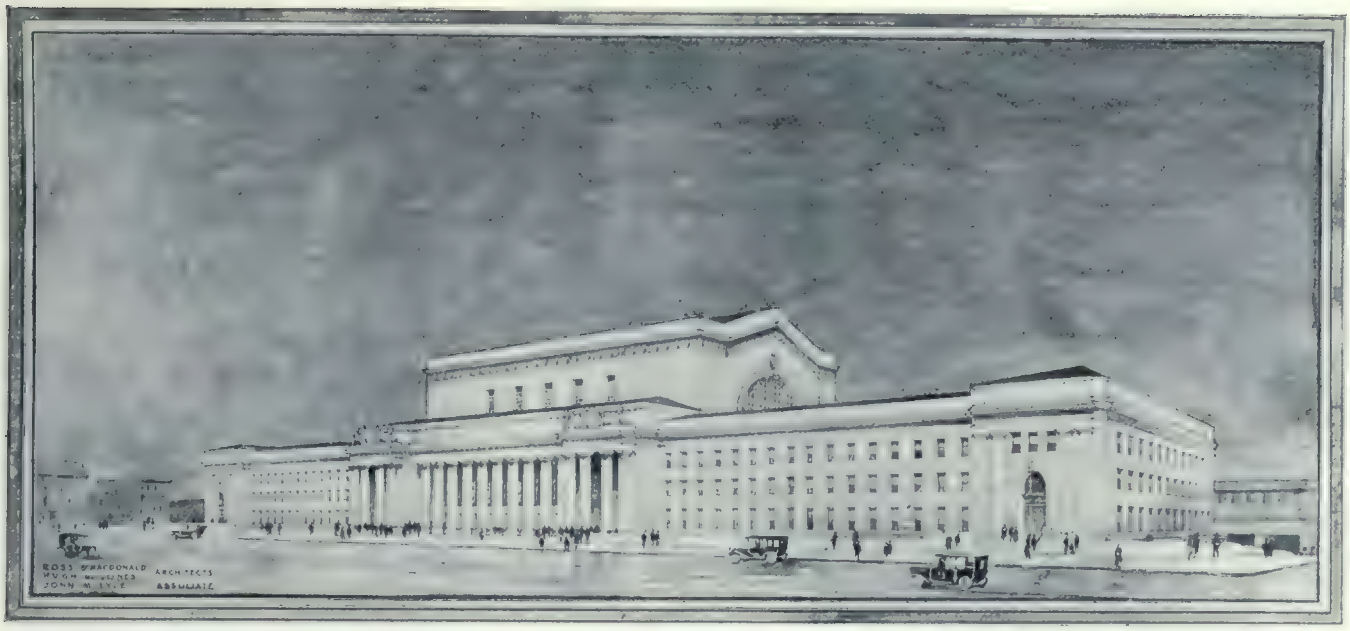
SECTIONS



FOURTH PRIZE DESIGN.

MASONIC TEMPLE, TORONTO, ONT.

A. W. GOULD & A. E. HARVEY, ARCHITECTS.



Toronto Union Station

THE Grand Trunk and Canadian Pacific railways entered into an agreement something over a year ago to form a Terminal Company for the purpose of erecting and operating a union station at Toronto. The Terminal Company appointed as its consulting engineers H. R. Safford, chief engineer of the Grand Trunk and J. M. R. Fairbairn, assistant chief engineer of the Canadian Pacific, with J. R. W. Ambrose, engineer of grade separation as chief engineer of the terminal. Messrs. Ross & Macdonald and Hugh G. Jones received the appointment as architects to design and supervise the construction of this work. They subsequently appointed as local associate, John M. Lyle, of Toronto.

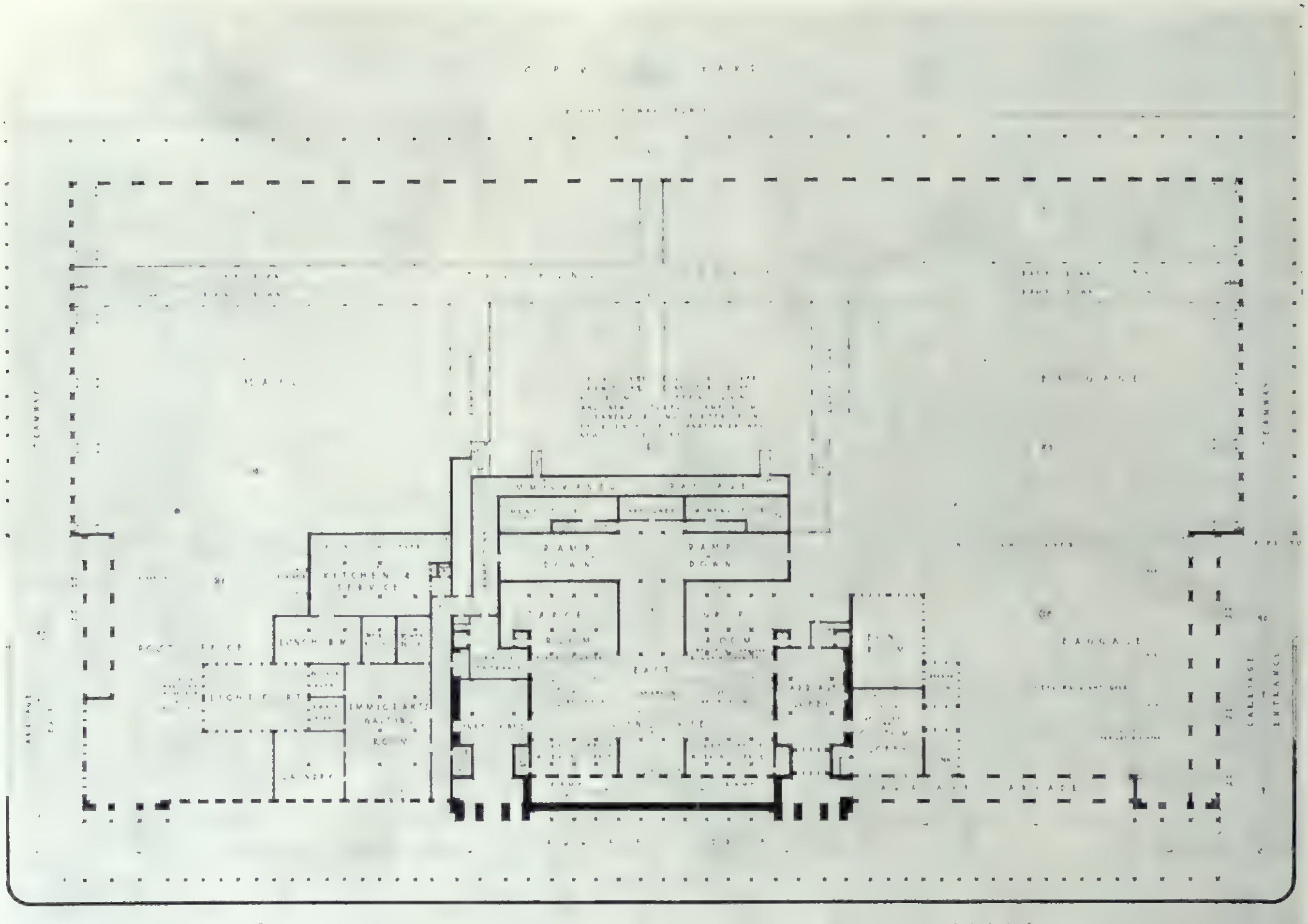
The architects were instructed by the board of engineers of the Terminal Company to study the traffic problem at Toronto in all its aspects and peculiarities, and, without dictation from either road to design a station which would adequately meet the needs of the passenger traffic of the city and to provide for the large growth of traffic indicated by the growth of population of the city and surrounding districts during recent years. They have been working faithfully and continuously on the problem for the past ten months and have collected and tabulated all of the traffic data of the station covering the past twenty years, so far as procurable. They have also made extended inspection trips, visiting all of the larger terminals in America and have obtained from these terminals the amount of traffic being handled by them. This information has all been compiled in tables, which furnish a scientific basis for the design of the new station for Toronto.

The architects' recommendations are contained in an exhaustive report which was presented to the engineering board of the Terminal Company and this report has been thoroughly discussed by representatives of both railroads.

This report shows the passenger traffic to be equal to that of Washington, D.C., and to be half that of St. Louis or Kansas City. The baggage business is, however, surprisingly heavy, being equal to that of the Pennsylvania Station, New York, and almost as great as that of St. Louis Station, Boston South Station and Grand Central Station, New York. The parcel business bears nearly the same relation, being equal to that of the Pennsylvania Station, New York, but is somewhat less than the Grand Central Station, South Station, Boston, Kansas City or St. Louis Stations. The fact is brought out that the average number of pieces of baggage or parcels per passenger is greater at Toronto than at any large station on the Continent, so far as records are obtainable.

The character of traffic handled at the St. Louis, Washington and Kansas City union stations is similar to that at Toronto. These stations handle a heavy through and local business with heavy maximum periods occurring during certain seasons of the year. The arrangements of these stations and the relation of their present traffic to the areas provided have been very helpful in regard to the requirements for Toronto.

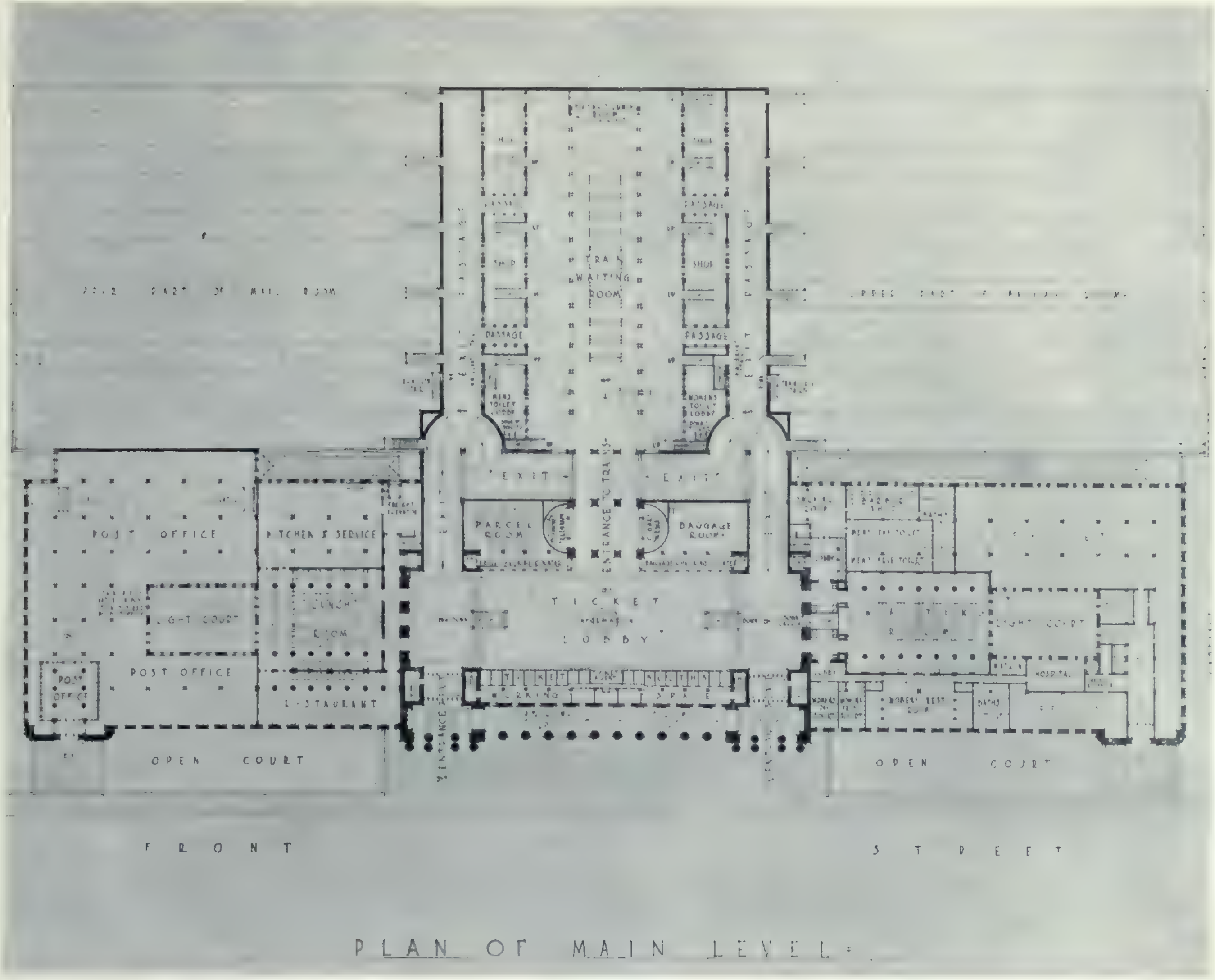
In considering the design of the station, it was found that the average normal traffic at Toronto could be taken care of by a station building of somewhat smaller dimensions than the one proposed, but it is in consideration of the heavy maximum periods such as Exhibition time, June and Christmas holidays, with their attendant crowding and discomfort, which have influenced



BASEMENT PLAN

the architects in recommending the construction of a building large enough to afford a complete separation of entrance and exit traffic during heavy periods and for the time when the traffic of the station has grown to demand it. This principle of the complete separation of traffic and the method proposed for accomplishing it has been accepted by the two roads interested, and is obtained through the utilization of conditions of the site and the relation of track levels to the street. This idea of complete separation of traffic is the dominating one in the design of the station. There has been no station constructed with a similar object in view where it can be so completely accomplished as is contemplated for Toronto, and we can therefore recite no parallel case. The Grand Central station in New York provides separation of express and suburban traffic on two levels, the inbound and outbound express traffic being further separated through the provision of additional separate station buildings. The Pennsylvania station, New York, provides a separate exit concourse, but the arrangements are such as to make the meeting of friends difficult. The new Kansas City station provides separation until the ticket lobby is reached.

It so happens at Toronto that the elevation of Front street above the present track level affords an opportunity for placing a train waiting room at a level midway between the street level and the proposed exit concourse beneath the ticket lobby. This arrangement approximately averages the distances which entrance and exit passengers have to travel and does away with all confusion and crowding and unsatisfactory arrangements for meeting friends, which have been borne by the public in the past. The great advantage to the travelling public will become immediately apparent to anyone who will analyze the operation of the station designed under these conditions. Passengers on entering the station to take trains will enter a large ticket lobby, approximately 90 ft. wide by 250 ft. long. In this lobby within plain sight are placed all of the general business facilities of the station. In the centre of the room is the information bureau; on one of the long sides the ticket offices to the number of 20; at one end of the ticket lobby is the restaurant and at the other end the general waiting room. Opposite the ticket offices are the parcel checking counter and the baggage checking counter, each with a frontage of 50 ft. These are separated by a 40 ft. entrance

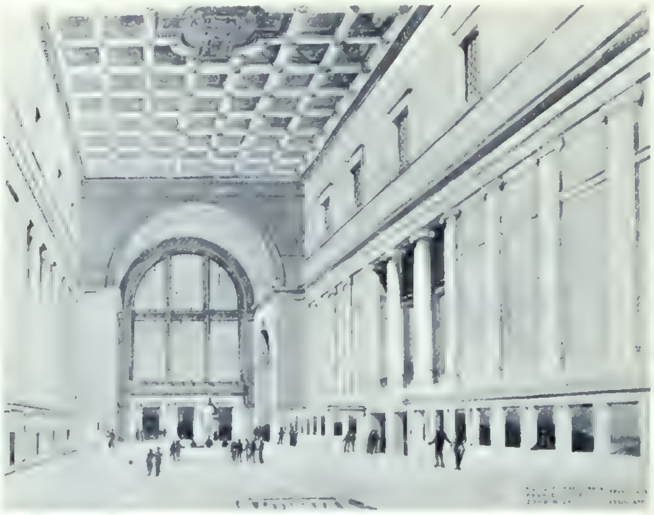


PLAN OF MAIN LEVEL

passage to the train waiting room. Owing to the elevation of the railroad tracks above the street level, this room is placed beneath the tracks. Similar rooms are provided in the new Michigan Central station at Detroit, and the new union station at Winnipeg, though these are much smaller than the one proposed for Toronto. The train waiting room is reached by passing down a broad easy ramp in the entrance passage from the ticket lobby. As the stairs to trains lead directly out of this room from either side, it will naturally be a gathering place for passengers after they have completed their business in the ticket lobby. This room, though limited in height by the elevation of the tracks, will be 100 ft. by 250 ft. and will be made attractive through the use of light-colored, durable materials, such as marble and glazed terra cotta, and will provide all the comforts which may be required by waiting passengers, including an abundance of light and ventilation and concessions for the sale of various articles which may be needed by the traveller. Access to trains is by stairs to the right for west-bound trains, and to the left for east-bound trains. Train bulletins and announcements concerning the arrival and departure of trains are located near each stair leading to train platforms.

Passengers arriving on trains will descend separate exit stairs leading from the train platforms to separate exit concourses placed each side of and flanking the train waiting room. For passengers who wish to transfer to trains on other tracks, provision is made to pass them through to the train waiting room. Passengers wishing to exit from the station will follow along the exit passages, and during light traffic will pass into the ends of the ticket lobby where they may meet their friends, transact their business and exit to the street or to cabs.

The difference in levels between the exit passages and the ticket lobby makes possible the provision of easy ramps from the exit passages to an exit concourse placed beneath the ticket lobby. During heavy periods exit passengers will pass through this exit concourse, which, except for the ticket offices, is practically a duplicate of the ticket lobby above, and exit passengers will find all of the facilities required by them within easy access. The information counter is in the centre of the room and parcel checking and baggage claim counters are provided in locations similar to and directly beneath those of the ticket lobby. The advantages of this arrangement for passengers are that the business capacity of the station is practically doubled and the transaction of passengers' business will be greatly facilitated through the absence of the interference of entering passengers. In the same manner, passengers hurrying to trains will not be hampered by crowds of exited passengers wishing to use the facilities of the station. The arrangements for meeting friends are ideal, in that there will be but one point where all passengers can be met, irrespective of the direction from which they arrive. It is expected that checked hand baggage can be delivered to passengers in a much shorter time and passengers having to pass baggage through the customs will find the customs offices close at hand. Provision is made for cab service adjoining the exit concourse.



TICKET LOBBY.

In connection with the general waiting room at the ticket lobby level, provision is made for men's pay and free toilets on one side and for women's pay and free toilets, adjoining a women's rest room on the opposite side, also a baby room, matron's room and emergency hospital, so located as to avoid the taking of invalids through the station building proper. Toilet facilities are also provided in connection with the train waiting room. A large lunch room and restaurant are located at the easterly end of the ticket lobby. Immigration quarters are so placed as to permit the passing of immigrants through the station without traversing the public portions of the building.

Large provisions for handling the enormous baggage and mail business in the station are made in the space beneath the train viaduct, with direct communication by elevators to all the train platforms. The building is to be fitted with every modern convenience for the traveller, and we believe whether operating under light or heavy traffic, the travelling public will be able to transact its business without congestion or confusion at any time.

The exterior of the building has been designed in an adaptation of Roman classic architecture, and it is the intention to secure a beautiful and dignified effect through the use of plain and simple wall surfaces and the sparing use of ornament, which becomes dingy and dirty in a few years on a building of this character. The interior of the ticket lobby will be of similar style to harmonize with the exterior.

The architects and railroad officials have given extended study to all of the conditions entering into the traffic problem of Toronto and the plans prepared will afford real relief to the travelling public and will provide facilities for the traffic for many years to come. It is believed that the station when completed and operated as outlined above, will provide the best and most conveniently arranged building of its kind on the continent. The plans are now being completed and should be ready for the reception of tenders within a few weeks.

THE HISTORY of skyscrapers dates back to ancient Rome. The tenement houses were so great in number and so badly constructed, that in A.D. 69 Emperor Otho, when marching against Vitellus, found his way barred for twenty miles by the ruins of tenement houses undermined by inundation. The spontaneous collapse of tenement houses at that time was so frequent an occurrence that it caused but little excitement. Tenants were constantly fearing cremation or burial in their homes and companies existed for the purpose of propping up and sustaining houses. Emperor Augustus limited the height of new houses that opened upon the streets to about sixty-eight feet in order to make less frequent such disasters. Martial alludes to a poor man, a neighbor, who was obliged to mount 200 steps to reach his garret.

THE following announcement in regard to the R.A.I.C. Assembly has been issued by Alcide Chausse, Hon. Secretary: The Seventh General Annual Assembly of the Royal Architectural Institute of Canada will be held at Quebec, Que., on September 21st and 22nd, 1914. A very interesting programme is being prepared which will include matters of interest to every architect is cordially invited and is welcome at all test is cordially invited and is welcome at all sessions and entertainments, whether a member of the R.A.I.C. or not. The programme will be sent early in August to all the members of the R.A.I.C. and will contain all the particulars concerning the Assembly. The committee of arrangements of the Assembly is composed as follows: J. H. G. Russell, J. P. Ouelet, R. P. LeMay, A. R. Decary, and Alcide Chausse.

Reinforced Concrete Construction, Hart House, Toronto

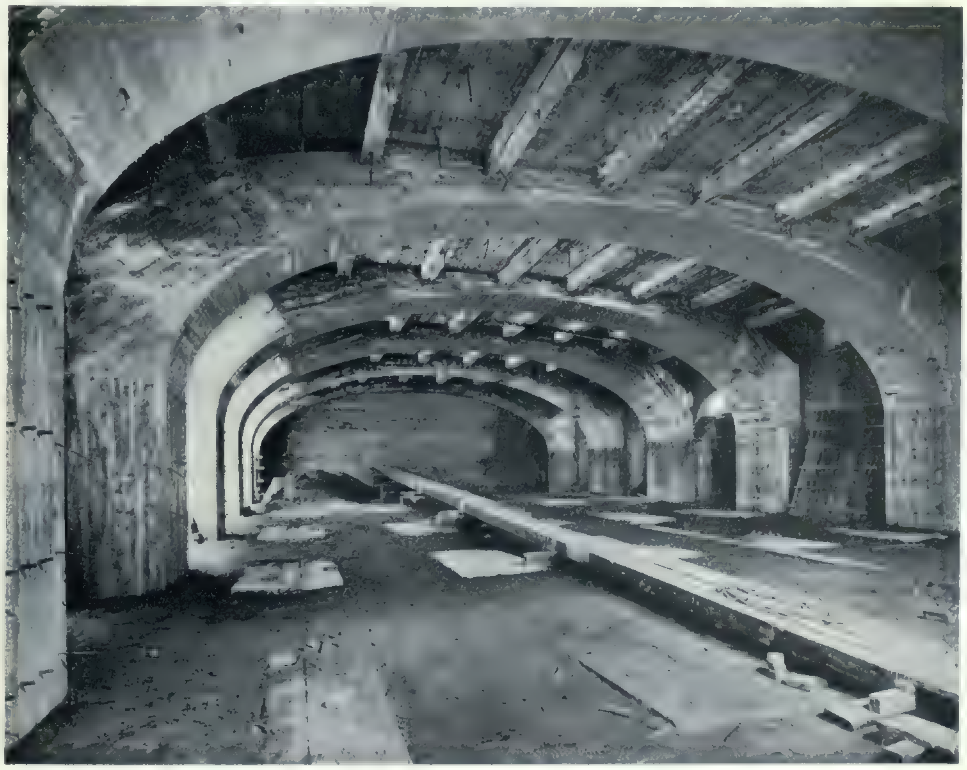
CLARENCE W. NOBLE

THE REINFORCED concrete construction in the auditorium of the Hart House, Toronto University, Sproatt & Rolph, architects, presents several unusual and interesting problems. The building is in the form of a quadrangle. The enclosed area is excavated and the auditorium under discussion is placed in the excavated area. It is covered by a roof which comes approximately at the ground line and supports a hanging garden. The centre of the garden will be occupied by a fountain surrounded by a cement walk, with the areas left thus unoccupied to be covered with earth and planted with flowers and shrubs. All of this is carried on the auditorium roof.

The distance between side walls of the auditorium is fifty feet, which, on account of the nature of the occupancy, cannot be divided by intermediate supports. The solution naturally suggesting itself for the support of a roof of this kind would be the use of steel trusses. These, however, would be far too deep for the available head room and steel or concrete beams would next suggest themselves. A beam, however, in this situation is also impracticable. It is necessary that the ceiling height should approach as nearly as possible to the level of the roof garden, and even a beam of this span in this situation would be deeper than would be reasonably allowable. An arch, on the other hand, could be built with a comparatively shallow depth at the crown and thus avoid this objection. This is the reason that an arch was adopted as a support for this roof.

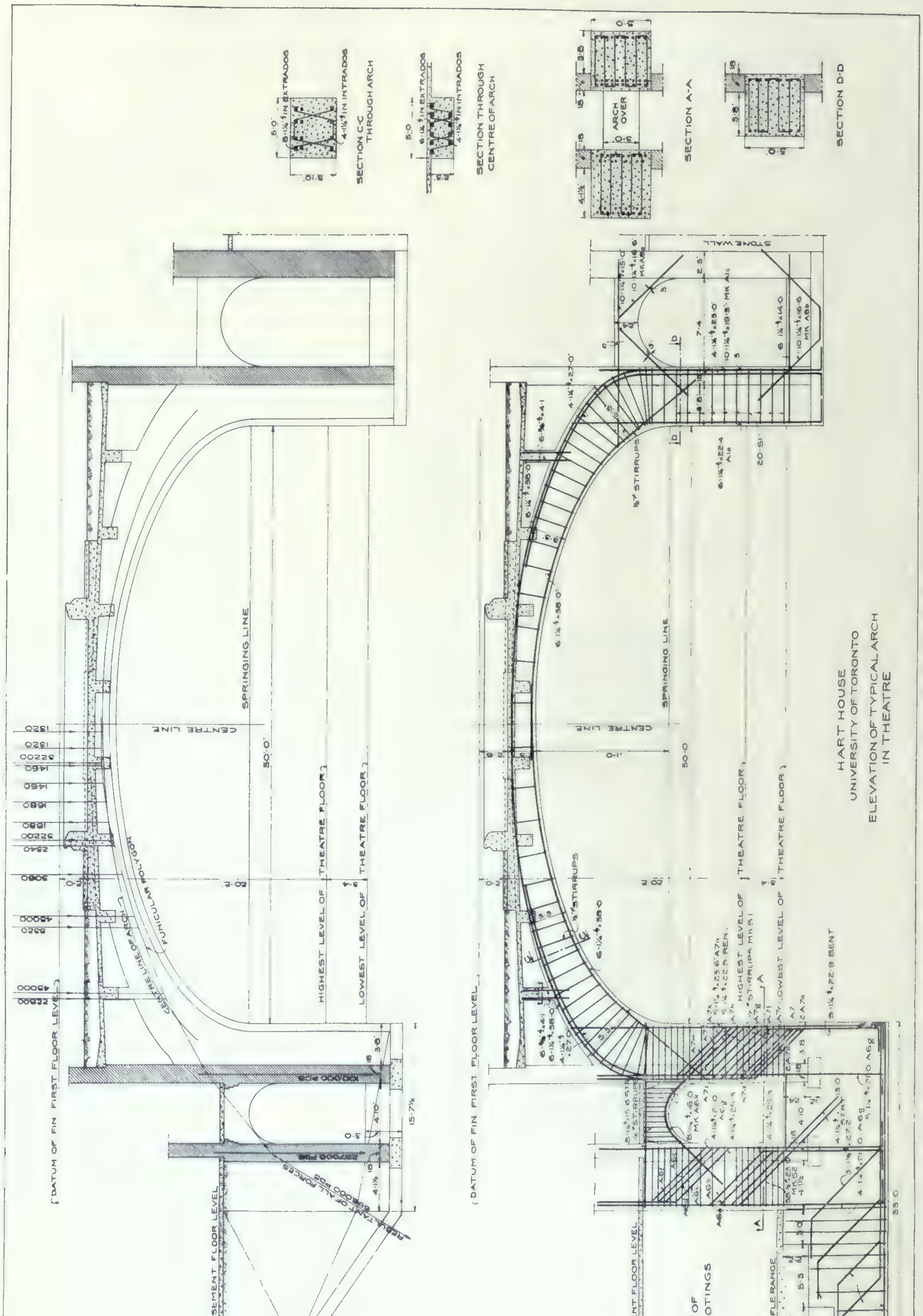
An arch, in order to be most economical under loads uniformly distributed, would be parabolic in form. It would rise well at the crown with a sharper curvature at the centre of the span than at the haunches, which would therefore be low and comparatively straight. An arch of this sort is objectionable for an auditorium, as the low haunches interfere with the line of sight. It was found necessary, therefore, in the early consideration of the design of this arch, to abandon the most economical type of construction. It was found necessary, in order to give the best possible view of the stage, to keep the haunches of the arch as high as could be done. This caused the adoption of an arch of elliptical form with the springing line well up on the side of the wall.

It was at this point that a new difficulty in the design of this arch was encountered. With the spring line well up from the floor it was found impossible to bring the horizontal thrust to the earth by any form of abutment ordinarily in use. The spring line is some thirteen feet above the floor, and the arch sprung directly from ordinary brick walls. These brick walls separate the auditorium from corridors which parallel it on either side. The line of thrust of the arches therefore must pass directly through these corridors. It is impossible to introduce an abutment of the ordinary type in the corridors without blocking them.



VIEW OF AUDITORIUM SHOWING CONSTRUCTIONAL ARCHES.

The opposite side of the corridor is variously occupied. A part of the area is unexcavated. In another location there is a rifle range. In still a third location it was planned to leave an unexcavated portion, but when construction took place there was found a splendid bed of building sand in this situation, and it was judged more economical to secure this sand than to leave this portion unexcavated. This area therefore was not utilized in the finished building.



CONSTRUCTION DETAILS OF AUDITORIUM IN HART HOUSE, TORONTO.

Several possible solutions of the problem were discussed, tried and abandoned. The first thought was to put a pilaster at each end of the arch. These would extend to the roof level, would support the arch and would be reinforced to form a vertical beam. The upper ends of this beam would be tied together by steel bars run through the roof slab, thus causing the horizontal thrust from the opposite sides of the arch to neutralize each other. This was abandoned because the ground on which the foundation rested was so soft that it could not be regarded as reliably able to take the horizontal thrust at the lower end of the beam.

An attempt was then made to remedy this difficulty by placing ties in the floor of the auditorium as well as in the floor of the roof garden, thus enclosing each arch in a rectangle consisting of two vertical beams and horizontal tie above and below. This was abandoned as being unduly expensive. The reinforcement required for the vertical beams was exceedingly heavy and the top and bottom ties presented practical difficulties on account of their length.

The present solutions were therefore adopted. The term solutions is advisedly used in the plural as there are three separate cases, each requiring their own type of abutment.

In each case the line of thrust was carried across the corridor by a small and heavily reinforced concrete arch. When this line of thrust, after crossing the corridor, went into an unexcavated area, an abutment and footing of the ordinary type was there constructed. This presented no unusual difficulties, except that on account of the height of the spring line, and the flatness of the arch, the line of thrust, even when the weight of the two corridor calls was considered, was unusually close to the horizontal. The first design of the footings was made with the intention of having the bottom surface of the footing not horizontal, but, as near as could be, perpendicular to the line of thrust of the arch. It was found, however, on excavating, that the soil uncovered was not suitable for a footing of this nature. The abutment was therefore redesigned and continued outward sufficiently to place the base of the footing in a horizontal position.

When the horizontal thrust of the arch, after crossing the corridor, came into an area which had been excavated in order to secure sand, it was found advisable to build in this situation a stone wall which could at the same time act as support for the reinforced concrete floor above and as a portion of the abutment of the arch. As the wall is on line with the arch the thrust passes through the wall, and the footing is designed to care for the load of the floor above, the wall itself and the horizontal thrust of the arch.

It was when the space on the opposite side of the corridor was occupied by the rifle range that the real difficulty of constructing the abutment was encountered. The placing of the arch over the corridor in this situation apparently had only the effect of transferring the difficulty from the wall of the corridor to the wall of the rifle range. It appeared equally impossible to put a satisfactory abutment in either situation.

The solution of this trouble is shown in the accompanying drawings. In brief the abutment is made in the form of a hollow rectangle. The two vertical sides are pilasters in the walls in either side of the corridor. The top is the arch over the corridors and the bottom is the footing. The four sides and corners of this rectangle are reinforced so heavily that the line of thrust from the arch can pass across and through it without causing greater stresses in the concrete or reinforcement than those used in ordinary practice. In this way the line of thrust is brought through the corridors in diagonal direction and passes into the rifle range at a distance only slightly above the floor. This is assisted in no small degree by the fact that the load on walls on both sides of the corridor tend to turn the line of thrust more sharply toward the vertical. In spite of this, however, it passes entirely outside of the rectangle as it would ordinarily be constructed.

All engineers and architects know that in order to insure stability in the footing of the wall on which there occurs a horizontal pressure it is necessary that the line of thrust must pass to the earth inside the middle third of the width of the footing. In order to insure this condition in the footings in question it was necessary therefore to extend them well under the floor of the rifle range. It was necessary to build these extensions as cantilevers and to pour them as units with the foundation under the rectangle. The cantilever reinforcement is very heavy.

The accompanying drawings show graphically the details of the solution in certain of these cases as well as the construction details. By comparison of these two sketches their relation to each other will be more readily understood.

The provisions of the Toronto building by-law increased the difficulty of the design of this arch. Safe stresses according to usual practice were secured in this design by an arch three feet wide. In order to meet the requirements of the building by-law, however, it was found necessary to widen the arch to five feet. This increase of forty per cent. in the weight of the arch had the natural effect of greatly increasing the horizontal thrust at the spring point, and consequently making a second solution of the abutment necessary. This second solution, on account of the greater horizontal stresses involved, was considerably more difficult than the original solution.

Engineering Books

The Slide Rule, by R. G. Blaine, explains the theory and use of the slide rule, logarithms, etc. It illustrates the quick and easy method of calculating by numerous examples worked out. The author realizes that many do not employ the rule through lack of a clear perception of the elementary principles and so endeavors to show in a simple manner the theory of the instrument so that anyone may master the slide rule in a short time. Published by E. & F. N. Spon, Ltd., London. Costs $1.00.

* * *

Handbook of Cost Data for contractors and engineers, by H. P. Gillette, is a reference book giving methods of construction and actual costs of materials and labor on numerous engineering works. This work differs from other books on prices of materials in that it covers the whole field of civil engineering and the costs are analyzed and discussed. The author appreciates the difference between a contract-price and a contract-cost and as a result furnishes a detailed description of the methods used in construction and operation. And while itemized cost data occupies part of the book, still a large section is devoted to an account of the manner in which the work is done, the organization of the forces, and the machines used. A number of the best systems for cost keeping are described. The wants of the contractor have been supplied by data giving the itemized unit costs under stated conditions while those of the engineer have been met by providing data whereby he can ascertain the number of units in a structure of a given class and size as well as the unit cost. The book contains 1854 pages, bound in leather, and costs $5.00. Published by the Myron C. Clark Publishing Co., Chicago and New York.

* * *

Mechanics of Engineering, by I. P. Church, comprises statics and dynamics of solids; the mechanics of the materials of construction, or strength and elasticity of beams, columns, shafts, arches, etc.; and the principles of hydraulics and pneumatics, with applications. Diagrams, illustrations and examples of a practical nature constitute a large part of the 834 pages comprising the book. The formulae are divided into two classes; those admitting of the use of any system of units whatever for measurements of force, space, mass, and time, in numerical substitution; and those which are true for specified units only. Attention is repeatedly directed to the matter of correct numerical substitution, especially in dynamics, where time and mass, as well as force and space, are among the quantities considered. In assigning values of the numerous coefficients necessary in hydraulics, the results of the most recent experimental investigations have been considered. The work is published by John Wiley & Sons, New York, and costs $6.00.

* * *

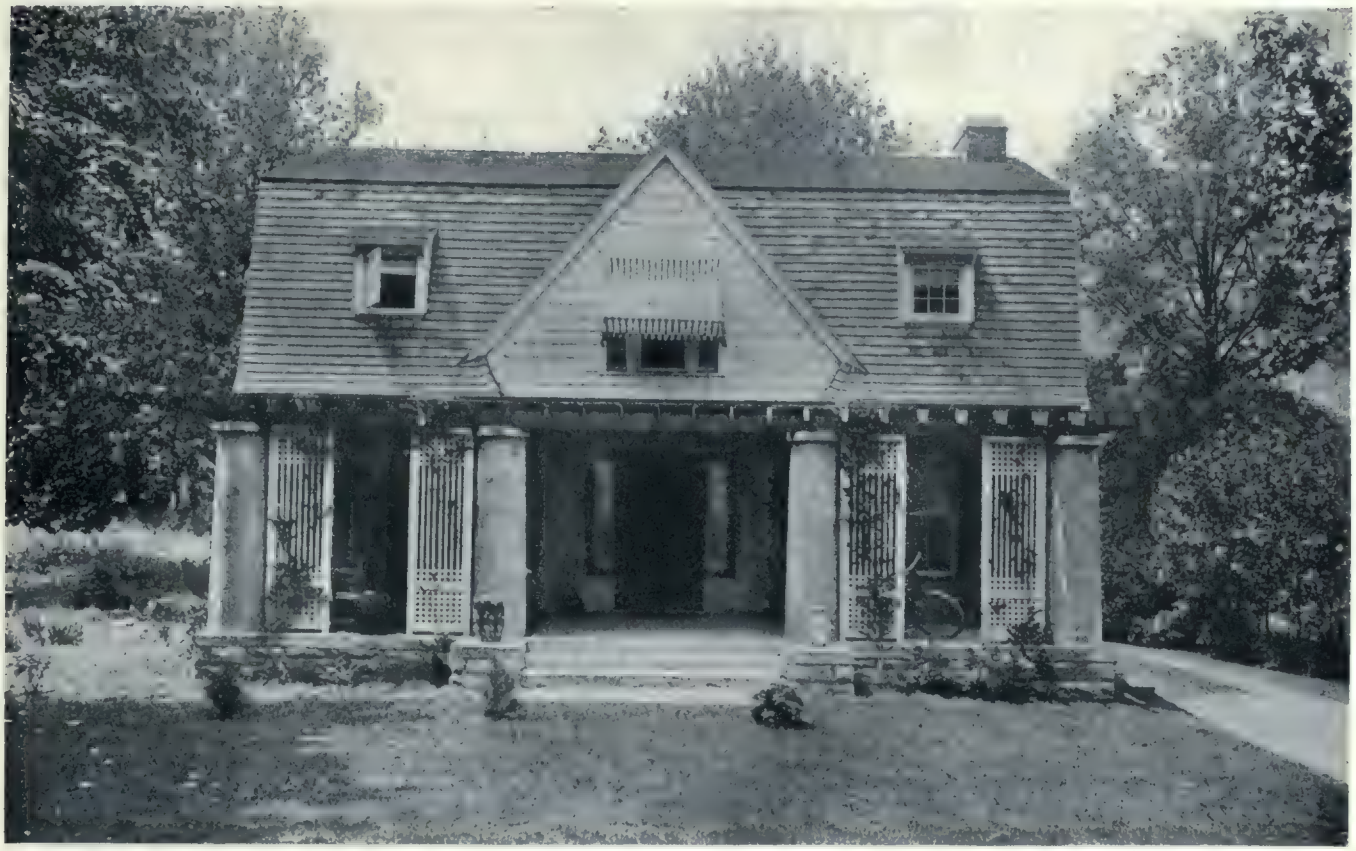
A Manual of Mining by M. C. Theseng and E. B. Wilson, is the fourth revised and enlarged edition based upon lectures delivered at the Colorado State School of Mines. The work consists of two parts; the first containing a brief geological review and a discussion of such points as the engineer must include in his report, *i.e.,* the preparatory and development work, systems of mining and the plant for power, hoisting, pumping, and ventilation; the second embracing the practise of prospecting, drilling, blasting, shafting, tunnelling, and timbering, in addition to some remarks upon the examination of mines. The principles of the construction and operation of machines used in mining are explained with a perspicuity and conciseness necessary among students and mining men, to whom a knowledge of the fundamenta of their work is valuable. At the end of each chapter is a list of references comprehending the latest literature on the subject. The book contains over 700 pages, illustrated. Published by John Wiley & Sons, New York, at a cost of $5.00.

* * *

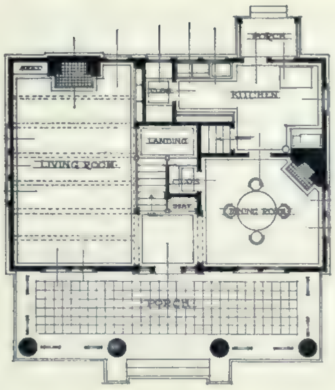
Fireproofing of Steel Buildings.—Joseph Kendall Freitag presents a systematized and collected form of information on the subject of the development of the fireproofing of steel buildings and its present most approved and efficient methods of treatment, as recommended and used in the best practice of the day. While appreciating the experimental stage of fireproofing, the author presents recommendations relative to all phases of constructional work which will in themselves produce as nearly a fireproof and waterproof building as the character of the materials employed will permit. The great need for such a work is felt in the stupendous fire losses in Canada and the States which are steadily increasing with the development and population of the country. The subject is covered under the following headings: Introductory and Development; Fires and Tests; Materials; Planning; Details and Equipment. John Wiley & Sons, New York, are the publishers of the book, which costs $2.50.

* * *

Any or all of the above mentioned books may be secured from Eugene Dietzgen Co., Ltd., 116 Adelaide street West, Toronto, or their Western agents, Strains, Limited, 313 Portage avenue, Winnipeg.

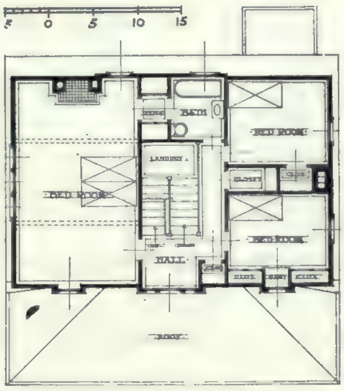


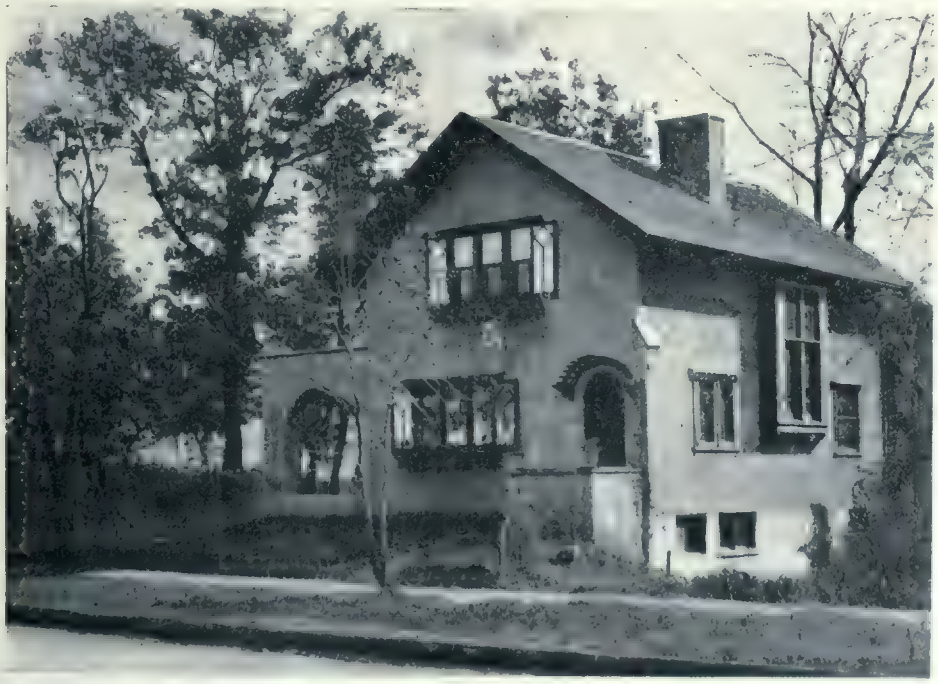
HOUSE AT ENGLEWOOD, N.J.

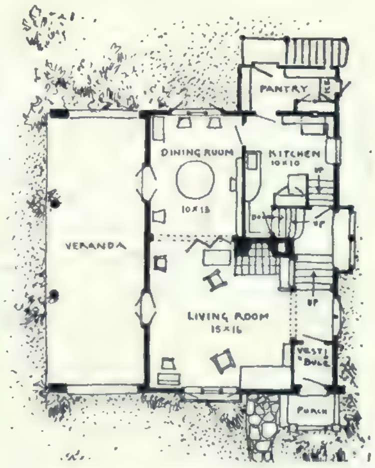


TWO SMALL AND INEXPENSIVE HOUSES.

Built of buff stucco upon metal lath; veranda floor of brick laid herringbone; trimmings dark brown with roof stained dull brown.







FIRST FLOOR PLAN.

TWENTY-FIVE HUNDRED
DOLLAR HOUSE,
CHICAGO, ILL.

CONSTRUCTION

A · JOURNAL · FOR · THE · ARCHITECTURAL
ENGINEERING · AND · CONTRACTING
INTERESTS · OF · CANADA

FREDERICK REED, Editor

H. GAGNIER, LIMITED, PUBLISHERS
Corner Richmond and Sheppard Streets,
Toronto - - Canada

BRANCH OFFICES:
MONTREAL—171 St. James Street
WINNIPEG, MAN.—13 Royal Bank Building
CHICAGO—People's Gas Building
NEW YORK—156 5th Avenue

CORRESPONDENCE.—All correspondence should be addressed to "CONSTRUCTION," Corner Richmond and Sheppard Streets, Toronto, Canada.

SUBSCRIPTIONS—Canada and Great Britain, $3.00 per annum. United States, the Continent and all Postal Union countries, $4.00 per anum, in advance. Single copies, 35c.

ADVERTISEMENTS—Changes of, or new advertisements must reach the Head Office not later than the twentieth of the month preceding publication, to ensure insertion. Mailing date is on the tenth of each month. Advertising rates on application.

CONTRIBUTIONS—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and duly returned.

Entered as Second Class Matter in the Post Office at Toronto, Canada.

Vol. VII . Toronto, May, 1914 No. 5

CURRENT TOPICS

THE architectural firm of Lindsay & Brydon announce the removal of their offices from 65 Victoria street to Trinity square and Yonge street, Toronto.

* * *

W. G. HUNT, formerly of 990 Bloor street W., and A. Woodburn, recently associated with the City Architect's Department, have opened offices at 244 Confederation Life Building for the practice of architecture.

* * *

BUILDERS' ACID, which is equal parts of muriatic acid and water, will remove spots of mortar on brick or stone work, but is not the right material for cleaning stone that is begrimed from smoke and dirt. To accomplish this, apply to the surface, with a long-handled fibre brush, a strong solution of caustic soda or pearl ash. Let it remain on for about fifteen minutes, then wash several times with clear water, using a stiff brush or broom for the purpose. If this will not be effective enough, scrub the stone with a stiff fibre brush, using soft soap and concentrated lye and sand, allowing this to remain on the stone until nearly dry, then rinse with clear water, using a brush to remove the cleansing material.

* * *

THE CONSTRUCTION of a dam across the St. John River at Meductic is proposed by the St. John River Hydro-Electric Company. The project has been laid before the legislature, and its promoters claim the work will cause an ultimate expenditure of some $3,650,000. The proposed dam will cross the St. John at Meductic above Fredericton and transmit power to Fredericton and Marysville, down the valley of the river over 80 miles to St. John.

* * *

COPING with physical handicaps which for many years baffled some of the world's greatest engineers, the Canadian Pacific railway is now projecting a scheme of greater magnitude than anything of its kind previously attempted on this continent—the boring of a five-mile, double-track tunnel through Mount MacDonald, one of the peaks in the Selkirk range, near Cambie, three miles west of Glacier. The passage will obviate the present necessity of using two long spiral "loops" on the western slope and many miles of snow sheds, the improvements being designed to effect a big grade reduction and the abandonment of one of the most costly sections of railway from an operating point of view, on the entire system.

A tremendous amount of excavation work has been done, the material scooped out being conveyed in dump cars and being deposited in places where filling has been found necessary for the roadbed. Two big steam shovels, one of them scooping up as much as 100 tons at once, are at work in the cutting which will lead up to the portal of the passage. The tunnel will follow a straight line under Mount MacDonald, emerging in the Beaver Valley.

The contractors are employing an entirely new method in tunnel piercing—they are projecting what is known as a "pioneer" bore. This is a small preliminary shaft, seven feet by nine, which will parallel the course of the main tunnel fifty feet distant and will be bored from both ends at the same time. The idea is quite in the nature of an experiment and was decided upon only after careful calculation and mature consideration.

With the "pioneer" bore the work will be greatly facilitated. Side drifts will be excavated leading into the course of the main tunnel and drillers will thus be enabled to attack a number of points at once. While blasting is proceeding in one part of the shaft the workers will be able to continue their activities in another instead of having to cease work each time a shot is fired as would be the case with the one heading. The same applies to the excavation part of the work. Lines of cars loaded with material can be kept continually in motion from the various drifts which would not be possible were the operations concentrated all at one point. Another great advantage is the fact that the "pioneer" bore will act as a ventilating shaft, enabling the passage of a current of air through the two bores and the connecting passages. It will also serve a permanent purpose in the same connection on the completion of the main tunnel.

One of the difficult engineering feats carried out in connection with the tunnel undertaking was the diversion of the course of the Illecilewaet River. This stream which during the spring freshets assumes the dimensions of a raging torrent, presented a great handicap, as its original channel crossed the location for the approaches at a point where a deep cutting had to be excavated to secure the necessary grade for the entrance of the tunnel, and then skirted the route for a considerable distance. While measures could have been taken effectively for carrying the tracks on trestles or bridges, there would still have been a danger of the river encroaching on the line or undermining the roadbed, and so it was decided to change the course of the stream.

Accordingly a deep trench nearly a mile long was dug on the left side of the approaches. This will act as a continuation of the original channel of the river and will divert the stream past the cutting to a point where an arched culvert will turn the water under the tracks again into the old creek bed on the right side of the railway.

The new location for the line will shorten the route by four miles. The enterprise is officially known as Roger's Pass tunneling scheme, and the work and related movements will involve the expenditure of more than $10,000,000. The tunnel will take rank as the longest railway bore in America. The Hoosac tunnel on the New York Central line is the longest at present, being just four and three-quarter miles through.

BOOKS

The 1914 Edition containing 5,000 facts about Canada can be secured from the Canadian Facts Publishing Co., Toronto, Canada, for 25 cents. The work is arranged alphabetically and full of valuable information.

"The Hollow Tile House," by Frederick Squires, consists of 15 short chapters which tell the whole story of tile, its manufacture, the English and European precedents for the use of stucco in covering its surface, somewhat about design, what architects design for themselves, and for the other fellow, the most recent devices for the treatment and decoration of stucco, and finally the development of tile as an exterior finish in itself. The book contains over two hundred illustrations chosen from foreign and American sources. Published by William T. Comstock Co., New York. Price, $2.50.

"How to Frame a House," or House and Roof Framing, by Owen B. Maginnis, seventh edition, revised and enlarged, contains one hundred and fifty drawings of houses, roofs, etc. Additional matter covers subjects which are not obtainable in other text books, such as the methods of rustic carpentry and joinery, methods of house moving, and miscellaneous framing, such as the building of review stands, grain elevators, boat houses, wooden bridge work and large wooden trusses. Published by William T. Comstock Co., Nwe York. Price, $1.50.

"Electric Light and Motor Wiring," by George J. Kirchgasser, is a pocket addition on the different systems of electrical wiring, how they are installed and the National Electrical Code requirements. The work is illustrated and possesses many diagrams of a practical nature. Published by the Electroforce Pub. Co., Milwaukee, Wis. Cost, $1.00.

* * *

ONE of the most costly items in the upkeep expense of sea water baths is the frequent repairs that have to be made to the piping, due to the rapid corrosive action of the sea water, especially when heated.

An interesting interview with the engineer of the Columbia Baths at Atlantic City was recently secured on the actual experience in these baths—which have been in constant operation for over fifteen years—with wrought iron pipe for conducting sea water, both hot and cold.

A suction line drawing water from the ocean was installed fourteen years ago, to supply the Columbia pools with sea water. Byers wrought iron pipe was used for this line, and for fourteen years gave no trouble whatsoever. Last summer, the baths were greatly enlarged and it was necessary to replace the suction line with a much larger diameter. The original lengths of Byers pipe, laid fourteen years ago, were found to be in prime condition, having lost very little from corrosion, despite the fact that they were exposed to both inside and outside action. This pipe was so good that it was laid again in another part of the work for another purpose.

An even more severe test was found to have operated on a heating system of Byers two-inch pipe, galvanized. This system was laid fourteen years ago, with the suction line referred to above, and when the extensive alterations to the plant last summer caused it to be taken up, it was found to be in almost perfect condition, and was replaced with no repairs whatever.

Fourteen years, under such conditions as the constant carrying of sea water, is a test for the corrosion resistance of pipe whose value will be readily admitted by the most exacting.

* * *

C. C. MENDHAM, who has been connected with the outdoor staff in Toronto of the Herbert Morris Crane & Hoist Company, Limited, has been appointed resident engineer in Berlin for the same company. This appointment is in line with the well-known policy of the Herbert Morris Crane & Hoist Company which consists not only in carrying large stocks of this manufactures to ensure prompt delivery, but in furnishing also a consulting engineering service which will advise on the best equipment for any given set of conditions.

* * *

LIGHTING the farm home by electricity, while not altogether a novel idea, is a convenience which comparatively few farmers appreciate. The Northern Electric Company, Limited, have just issued a comprehensive bulletin covering their low voltage lighting outfits. With such an outfit installed, the farmer may enjoy the same electrical conveniences as have heretofore been confined to those living in cities or towns. Electric irons, toasters, vacuum cleaners and fan motors are only some of the many conveniences that may now be used on the farm. A copy of the bulletin may be secured by writing this company at their nearest office.

* * *

"MEDUSA WATERPROOFING" is the title of a practical booklet issued by the Stinson-Reeb Builders' Supply Company. The contents treat of the history, uses, tests and advantages of waterproofing materials; the successful results obtained under heavy water pressure; testimonials from various sources, and illustrations of buildings where "Medusa" waterproofing has been used. The booklet may be obtained by writing this company at their new address, Read Building, Alexander street, Montreal.

* * *

THE Master Builders' Company have appointed Neil Gillies manager of the Toronto office. Mr. Gillies first came to Toronto as manager of the Canada Floors, Limited; later he formed a partnership under the firm name of Brett, Gillies and Moyes of Montreal and Toronto, carrying on an extensive business in composition and asphalt flooring. Through this connectionMr. Gillies is well-known among architects and contractors, and should prove a valuable acquisition to the company.

* * *

"THE TOWN of Asbestoslate." This title in red, on a sketchy cover of Scotch grey, introduces a most attractive booklet. By way of describing a thriving little Canadian town, whose real name we will leave you to find out, it illustrates some charming homes and attractive public buildings. These and dozens of others in this embryo city, are roofed with Asbestoslate—hence the name. The exceptionally artistic tone of the booklet does not prevent it from giving many valuable suggestions and much useful information to intending builders, to whom the publishers will be glad to send it on request. Write the Asbestos Mfg. Co., 263 St. James St., Montreal, for a copy of "The Town of Asbestoslate."

* * *

THE TITLE, "Waterproofing for Cement Houses," is given to a booklet in which the problem of waterproofing cement stucco houses is discussed logically and interestingly. Such a careful treatment of this subject is bound to increase interest in the use of cement stucco, and in the necessity for safeguarding against dampness. The booklet is written around Ceresit Waterproofing Compound, which is explained by the fact that it is issued by the Ceresit Waterproofing Company, Chicago.

* * *

THE DESIGN for the reinforced concrete construction used in the auditorium of the Hart House, Toronto, illustrated in this issue of Construction, was made by Clarence W. Noble. Mr. Noble also supplied the reinforcing bars.

THE LAST WORD

in the art of manufacturing High Grade Surveying and Drawing Instruments has been developed in the Dietzgen Instruments, the possession and use of which guarantees accurate results.

Scales, Slide Rules, Draughting Equipment and Accessories of a complete list are also manufactured by us and sold direct to the Architect and Engineer.

BLUE PRINTS
made from tracings a specialty.

EUGENE DIETZGEN CO., LTD.,
116 Adelaide St. W., Toronto.

CONSTRUCTION

June, 1914 Vol. 7., No. 6

CONTENTS

EDITORIAL 213

The modern hotel a product of study and experiment——First International City Planning Conference held in Canada——Regulation of the billboard nuisance

FORT GARRY HOTEL, WINNIPEG 217

CURRENT TOPICS 236

BRICKS AND BRICK MAKING 237

TRADE NOTES 249

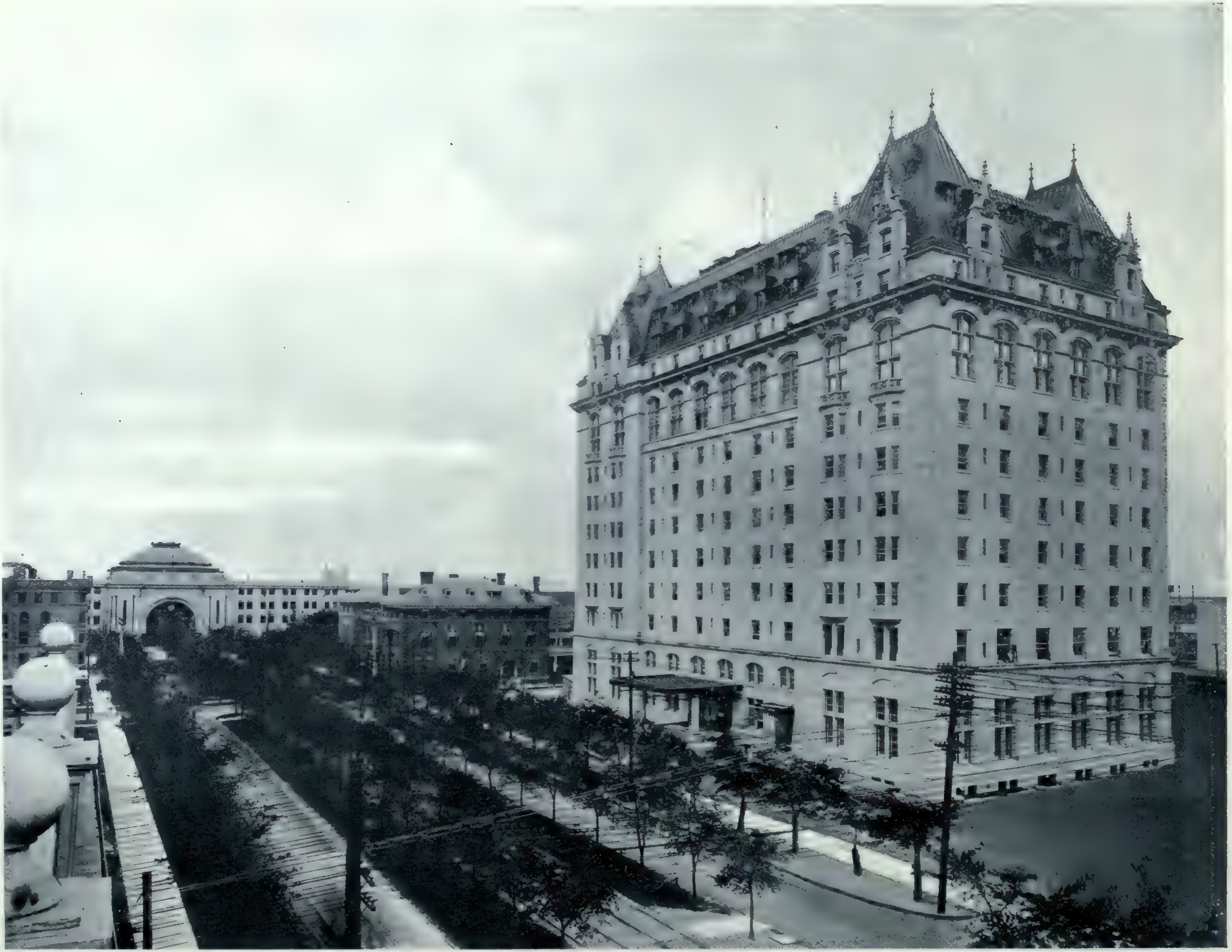
Full Page Illustrations

FORT GARRY HOTEL, WINNIPEG .... Frontispiece

FORT GARRY HOTEL, DETAIL OF FACADE 215

FORT GARRY HOTEL, DETAIL OF ROTUNDA 216

H. GAGNIER, Limited, Publishers
GRAPHIC ARTS BLDG., TORONTO, CANADA
BRANCH OFFICES:
MONTREAL WINNIPEG CHICAGO NEW YORK



FORT GARRY HOTEL, WINNIPEG, MANITOBA.

EDITORIAL

The modern hotel in respect to the vast changes which enter into its construction, decoration and equipment—a result of study and experiment.

THE MODERN HOTEL, while still in an experimental stage, is gradually approaching the state of perfection from the standpoint of the travelling public. There is no longer a constant dread of fire since the construction throughout is, in most cases, thoroughly fireproof. And no hotel should be allowed which does not practically guarantee the lives of its guests, regardless of the locality or existing conditions. That so many people have lost their lives in flimsy structures is lamentable, but this irreparable loss has awakened a keen desire on the part of the financiers backing such projects to build for safety as well as comfort. A change is also evidenced in the decorative qualities, and the gaudy mass of needless ornament is being replaced by a simplicity and refinement more in keeping with the tastes of those who patronize hotels. The public lobby is no longer an advertisement for mercenary proprietors, but rather an endeavor to create the feeling of homeliness. Instead of the main office occupying the most important position of the main floor, and assuming control of the entire business transacted, it has been placed in a conspicuous but unobtrusive part of the foyer or rotunda, while the clerk located on each floor near the elevator attends to the service on that floor. The sleeping quarters have undergone a similar transformation. The figured paper on the walls is a feature of by-gone days and instead the plaster is tinted; the brass bedsteads are disappearing for wood designs that correspond in style with the other fittings of the room. Until recently it was beyond reason to have an interior toilet and many a pleasing facade has been spoiled on this account. But with a proper ventilating system the inside bathroom is better than one on the outside, since the current of air is always positive from the room through the bath and up the vent-shaft. New ideas have brought about efficiency and economy in the kitchen service. Such problems as ventilation, refrigeration, smoke, draft, equipment, have been carefully studied so as to meet the most exacting demands of a discriminating public. The use of tiles in all departments is quite a potent factor in the modern hotel. They are not only sanitary but decorative. Their utilitarian value is recognized for bathroom finish; their artistic effect in relief modelling and colored enamels appreciated in restaurant rooms and rathskellers; their refinement of feeling and form in panel designs and conventionalized groupings of fruits and flowers; their non-staining and lasting qualities so suitable for kitchen and service floors—all combine to make this phase of burnt clay a most practical and æsthetic one.

First international city planning held in Toronto—The influence of its discussions and exhibition—The draft bill presented for a Town Planning Act.

THE FIRST International Conference on City Planning held recently in Toronto under the auspices of the Commission of Conservation was an inspiring success from the standpoint of all parties interested in the sane progress of this great movement. The strong personnel of the speakers kept the enthusiasm on all phases of the work keyed to a high pitch. No less profitable were the discussions which brought out more strongly the practical phases of each address and which gave to this representative body many new ideas worthy of consistent study. That the Canadian cities will profit greatly from this conference is assured, for already steps have been taken to hold a strictly Canadian convention so that the suggestions offered by the speakers, who were mostly from other countries, may be considered in relation to local needs and that more definite action can be taken for the furtherance of city planning throughout the various Provinces.

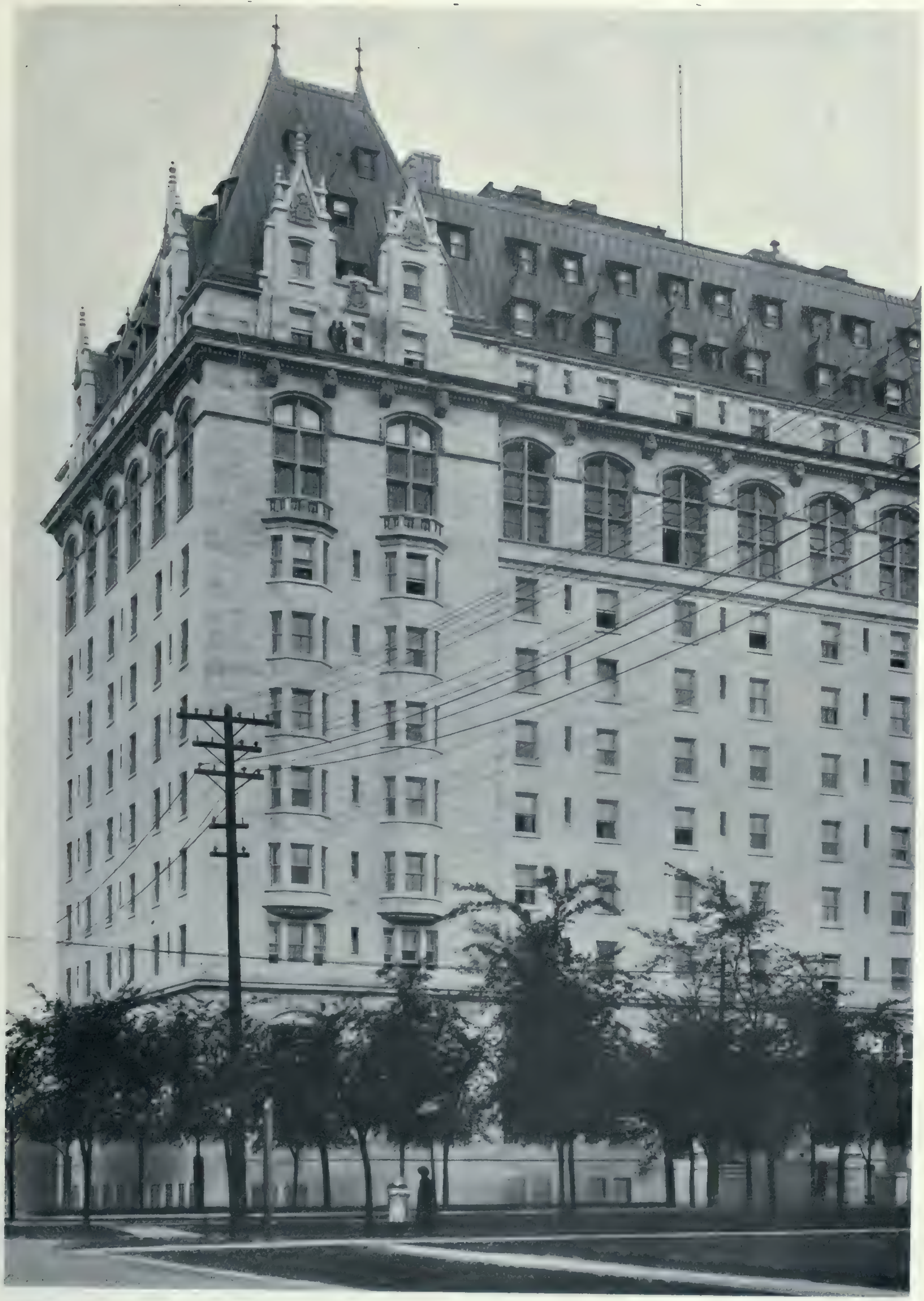
One point of special interest to the people is the draft bill of a Town Planning Act which was thoroughly discussed and changed in an endeavor to meet the existing conditions in all parts of the Dominion and which is to be submitted to the various legislatures for enactment. The Act calls for a central town planning board, with a permanent paid official at its head; a local housing board which borrows money only with the consent of the municipality and which has the right of appeal to the central board in carrying out its schemes. In commenting on the bill, Hon. George Langley, minister of municipal affairs for Saskatchewan, objected to the provision which would place the administration of a town planning scheme under the direction of a board not directly responsible to the council of the municipality concerned, and would, moreover, transfer much of the authority to a provincial board.

C. H. Mitchell, of the Toronto Civic Guild, expressed the idea that it would be hard to keep the work of the local boards defined from that of the municipal council. Other frank expressions were offered from which it is safe to predict that a draft will eventually be drawn which should prove satisfactory to all persons concerned and which will enable the various cities to unravel the perplexing problems of the present as well as provide for their future expansion.

Aside from the discussions there was an exhibition which presented the intricate problems met with in the States and the solution adopted for each one. This collection under the direction of the "American City" furnished examples of practically every feature which might arise in the broad question of town planning. In addition to this the Canadian work was also shown, including plans for the future development of Toronto, Montreal, Calgary, Saskatoon, along with suggestive schemes of a practical and theoretical nature. The best plans and ideas of the exhibition, along with the papers, will be taken up in a future number of Construction with a sincere hope that it will assist in furthering this most worthy movement of City Planning.

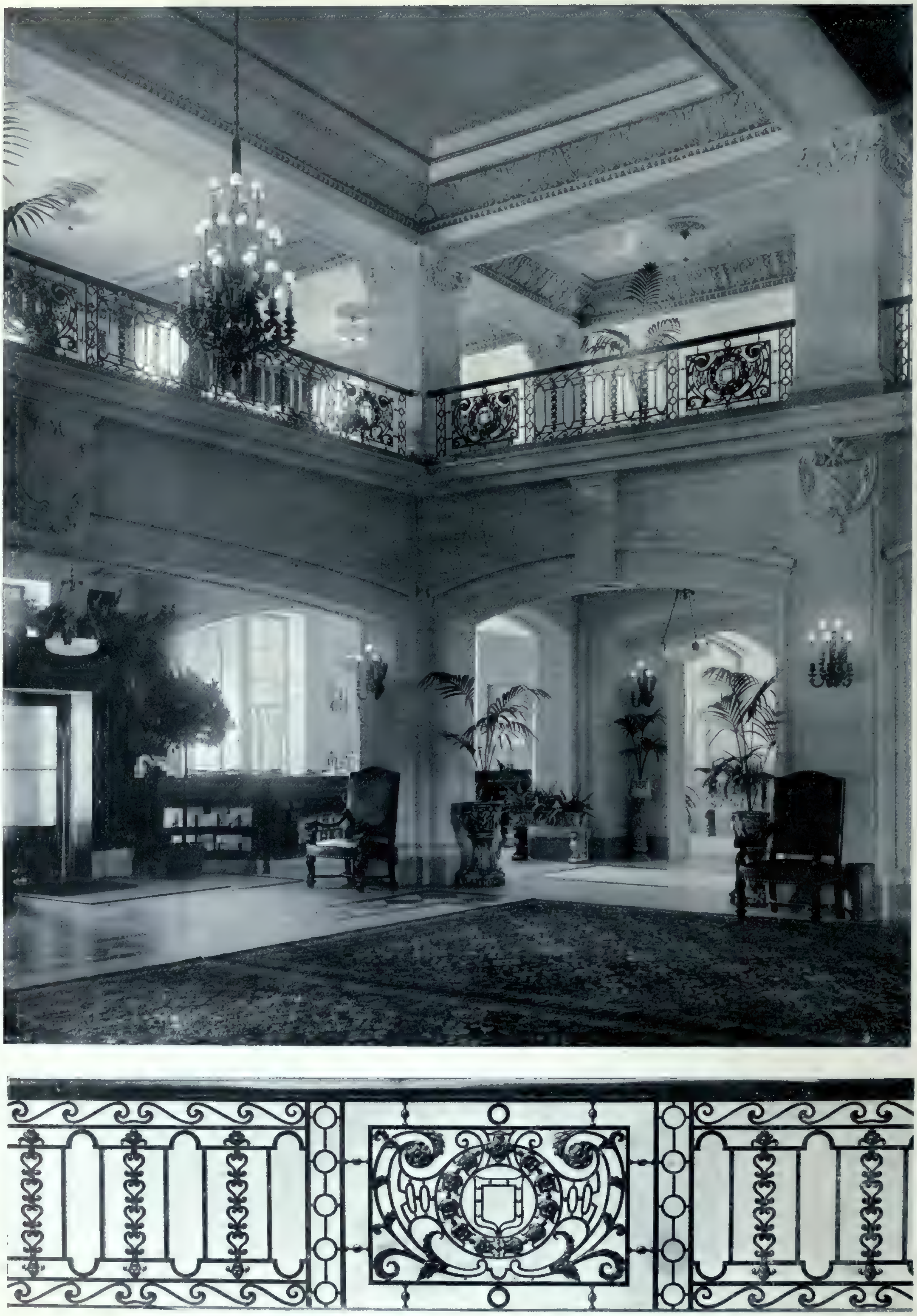
The billboard nuisance—Action taken in other countries to regulate all forms of public advertising—Laws needed in Canada to prevent its abuse.

HOW LONG the privilege will be extended to outdoor advertisers to depreciate the value of property, endanger public safety and mar the artistic appearance of our streets, is questionable. However, the matter is being seriously considered in various large cities where radical reform is about to be or has been enforced. In December, 1912, a commission was appointed in New York City to investigate this question, not only in the States, but also in European countries. The result of their work has been to recommend legislation which would prohibit all outdoor advertising structures, except shop-signs, advertisements on vehicles, etc., on or in the immediate neighborhood of parks, squares, public buildings, schools, boulevards and streets of exceptional character, even to the exclusion of advertising structures which obstruct fine views. In addition to this they would eliminate all large electric signs in residential districts; prohibit all signs fastened across doors and windows; limit roof signs to ten feet in height; and take away all advertisements on tenement houses and dwellings. To appreciate why such drastic action is necessary, it is well to note that 3,800,000 square feet of billboards exist in New York alone, many of them being unsightly, while others are vulgarly attractive. Practically 300,000 square feet of additional space is added each year, most of which is used for liquors, tobacco, chewing-gum, and amusements. That such form of advertisement is profitable has been disputed by very reliable critics. One firm which spends $1,000,000 per annum on this form of advertising says: "The results are not what we hoped for—we have spent a large amount on outdoor advertising and it is not profitable compared with other forms—newspapers, magazines, pamphlets, etc., are basic." If this be true, then the rights and interests of the general public should be considered. In the first place, many signs are objectionable and whether or no the people discountenance them, they are continually before one's vision so that it is impossible to escape their obtrusiveness. They mar the æsthetic appearance of every inspiring view, whether it be the country through which we pass or the very heart of the business districts. The one chief object is to utilize the position where the most people pass and which cannot fail to attract. Such violation of art and good taste is to be condemned. Private enterprises should not be forced upon the people at the sacrifice of beautiful parks and artistic thoroughfares; and the architectural effect of churches, public buildings and private residences. In this regard it would be well to accept the experience and final action of European countries. In England, Parliament adopted laws preventing the exhibition of advertisements which would injure the artistic effect of public parks and highways or disfigure the beauty of a landscape. France permits of no defacement of streets or public places with crude announcements of private enterprises. Germany restricts street billboards and permits them only to the kiosks located at prominent street intersections. In cities like Buenos Aires, Rio de Janeiro, Lima, and Valparaiso, all outdoor advertising is strictly regulated and taxed. The work already done in the various Canadian cities is commendable and should be continued until the Government enacts certain measures which will preserve a dignified appearance to our rural sections as well as our cities, and protect the people from the forceful and objectionable announcements of a few mercenary individuals and corporations.



DETAIL OF FORT GARRY HOTEL, WINNIPEG, MAN.

ERECTED UNDER THE DIRECTION OF ROSS & MACDONALD, ARCHITECTS.



DETAIL OF ROTUNDA AND MEZZANINE GALLERY, FORT GARRY HOTEL, WINNIPEG, MANITOBA.

Fort Garry Hotel, Winnipeg

OCCUPYING the site of the historical fort belonging to the Hudson's Bay Company, the Fort Garry Hotel stands as a living monument to the progressive spirit of our early settlers. In 1793 the traders awoke to the fact that others were cutting off their trade with the Indians, and as a result forged their way through an unknown country to the junction of the Assiniboine and Red Rivers. Here they built their first fort, called Gibraltar, 1806, which fell into the hands of the North-West Company after a reign of violence, murder and robbery. In 1816 the fort was retaken and destroyed, only to be established again in 1822 under the name of Fort Garry, through the amalgamation of the Hudson's Bay and North-West Companies. During the year 1835 it was rebuilt with large stone walls 280 by 240 feet, well bastioned and defended by thirteen six-pound guns, while in 1850 the present gateway was added, which alone escaped the demolition of 1882. Fifteen years later the Hudson's Bay Company presented to the city of Winnipeg the gateway and park wherein it is located.

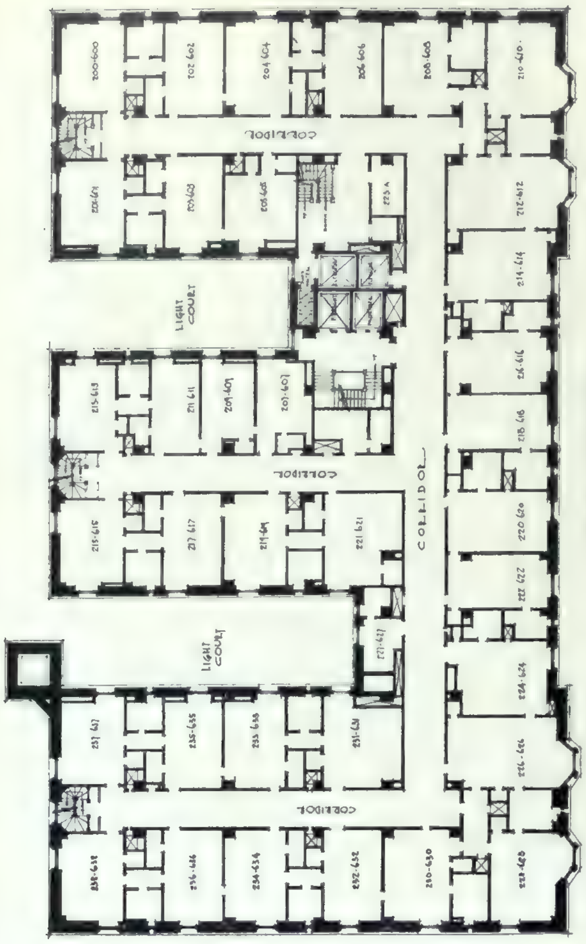
GATEWAY TO OLD FORT GARRY.

To appreciate the need of a modern, up-to-date hotel like the Fort Garry in Winnipeg, it is only necessary to consider briefly the city's rapid growth. In 1825 Alexander Ross, a fur trader, received from the Hudson's Bay Company a gift of one hundred acres of land, upon which has since been built the city of Winnipeg. In 1855 the city prided herself in having a population of 5,970 people, also twenty windmills and eight watermills. From the incorporation of the Hudson's Bay post in 1874 to the present time the population has reached 270,000, with her wide streets flanked with imposing edifices, the indications of a commercialistic age.

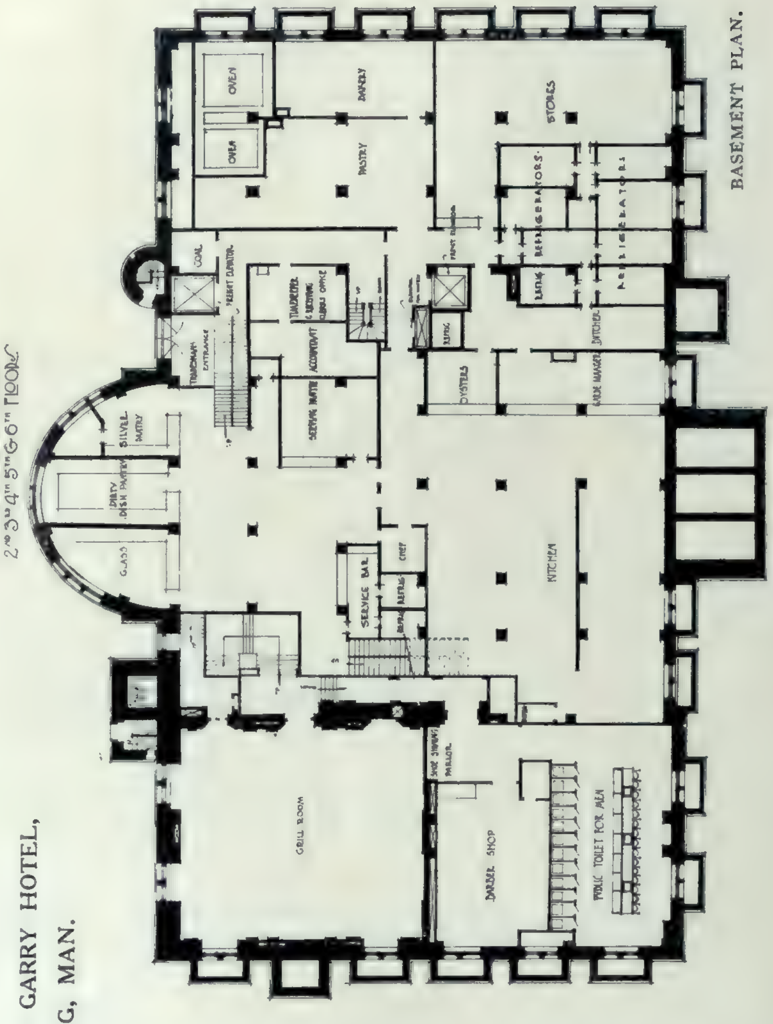
The railway hotel has become a prominent feature in the tremendous growth of Canada. The Grand Trunk Pacific Railway have grasped the essential needs of an extensive country where long stretches exist between the various settlements, and are erecting a far better class of buildings for the travelling public than could be entertained by private enterprises, especially in small cities and places of rest and recreation. The Fort Garry enables passengers to find safe and satisfactory accommodations within a few rods of the station and away from the noise and dirt of the business section or the railway lines themselves. In addition to the Fort Garry the Grand Trunk Pacific Railway have built the Chateau Laurier at Ottawa, and the Highland Inn at Algonquin Park; while they have in the course of construction the Macdonald at Edmonton, which will be opened this coming October; the Qu'Appelle at Regina, the Prince Rupert at Prince Rupert, and the Minaki Annex and Inn. In all of these hotels every modern convenience known has been or is being introduced. All the mechanical as well as service departments are the resultant of the experience obtained in the best hostelries of Europe and America.

Rising to a height of fourteen stories, the Fort Garry Hotel furnishes a magnificent view in every direction. Directly in front is the large number of tall and artistic business blocks which are rapidly emerging into one unbroken palisade of activity stretching across the city. To the east is the Union Depot, lying near the river, beyond which is St. Boniface, with her splendid cathedral and college group, while off in the distance lies Transcona. Turning to the south, the rivers wind gracefully off into the never ending distance of a prairie land, disturbed here and there with towns of local interest, prominent buildings and aquatic clubs. Westward in the midst of a regular forest are found the homes, the churches, the legislative buildings, in striking contrast to the skyline of the business section on the right. Off in the distance is the Assiniboine Park.

No less attractive is the immediate surroundings of the hotel. From the large entrance archway of the Union Station the eye is carried along the wide Broadway boulevard with its

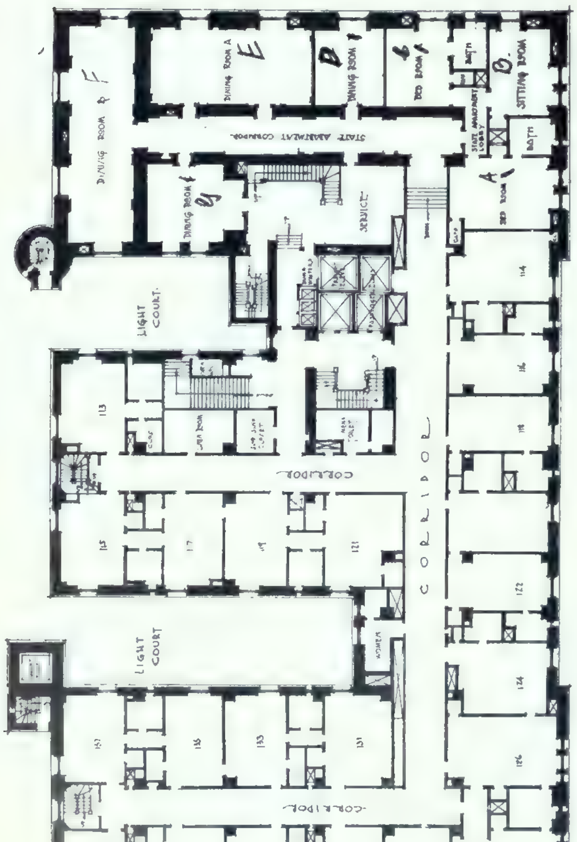


TYPICAL FLOOR PLAN
SCALE
2nd 3rd 4th 5th & 6th FLOORS

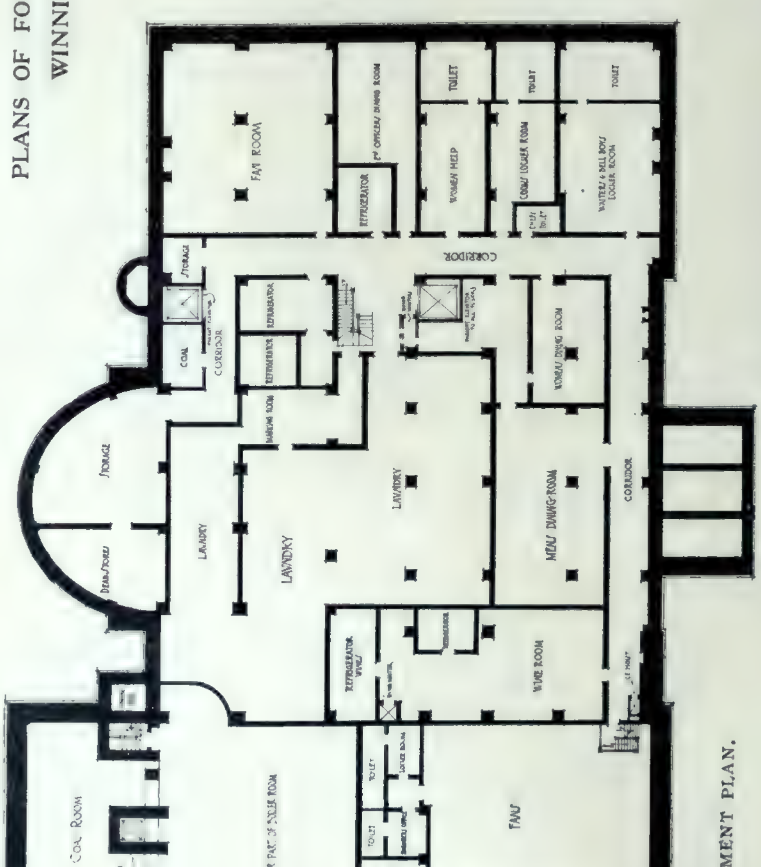


BASEMENT PLAN.

PLANS OF FORT GARRY HOTEL, WINNIPEG, MAN.

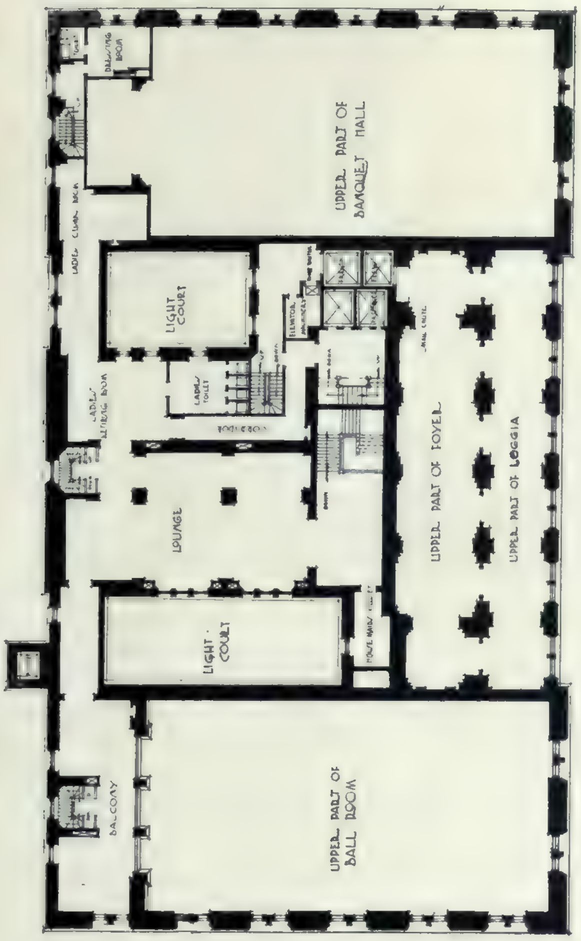


FIRST FLOOR PLAN.

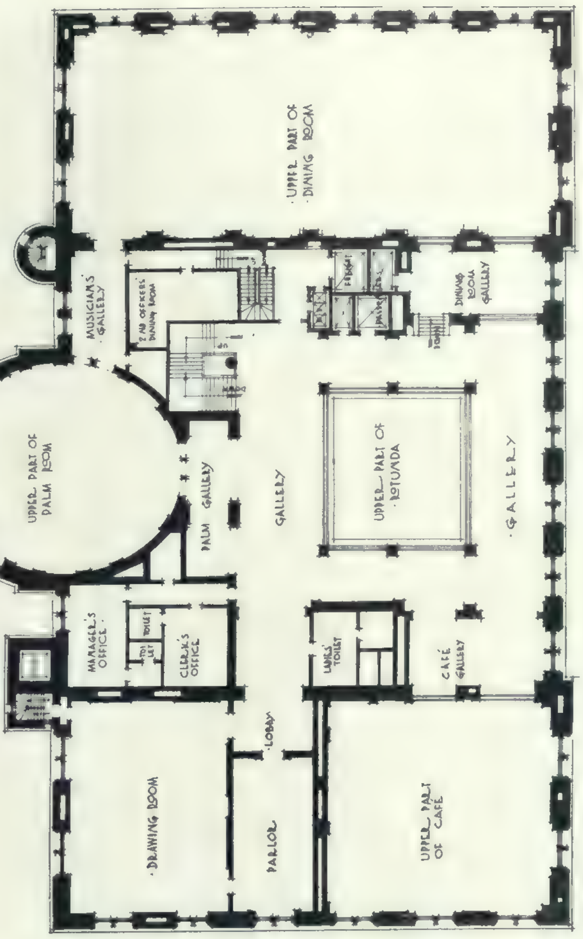


SUB-BASEMENT PLAN.

PLANS OF FORT GARRY HOTEL, WINNIPEG, MAN.

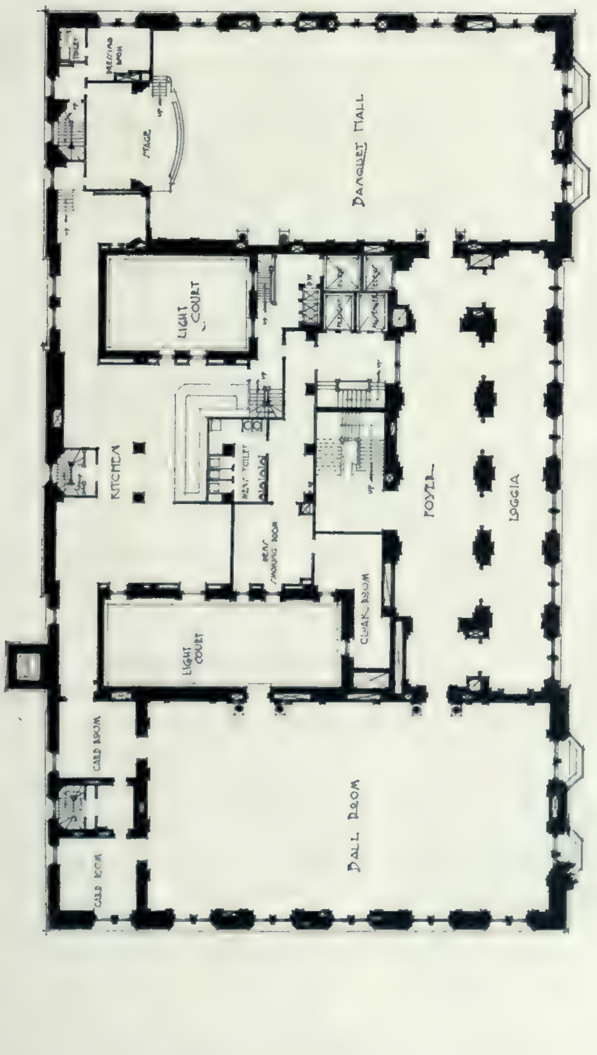


BALL ROOM MEZZANINE FLOOR PLAN

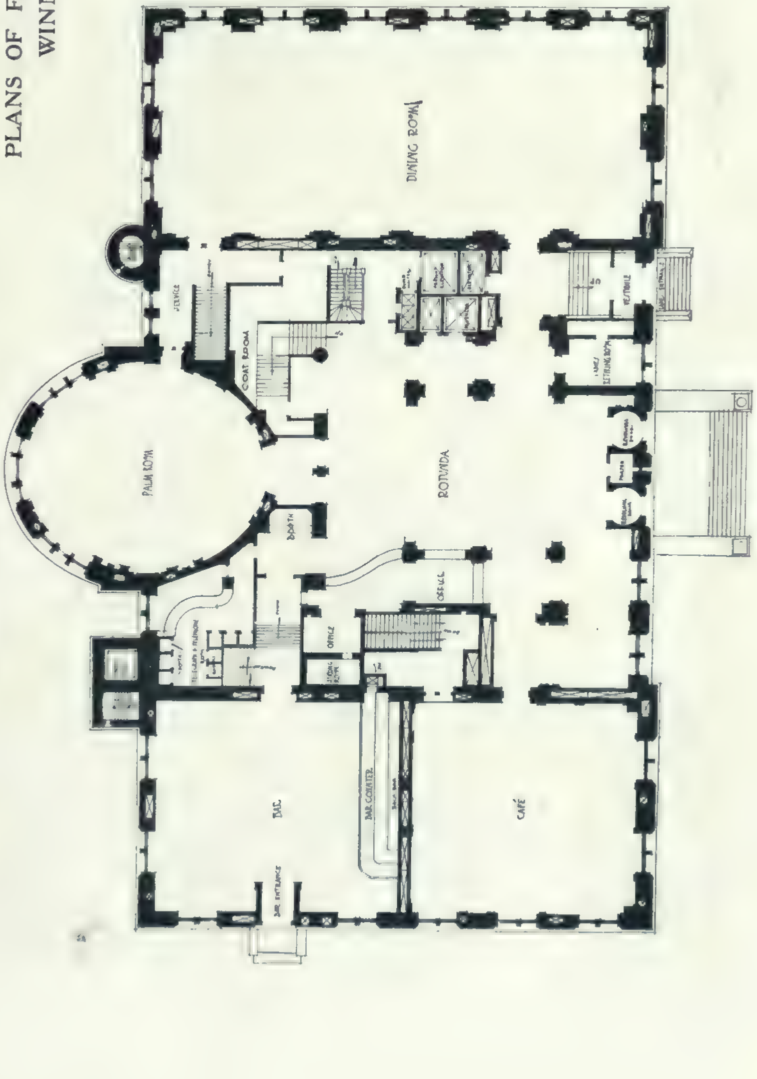


GROUND FLOOR MEZZANINE PLAN

SCALE OF FEET



BALL ROOM FLOOR PLAN
SEVENTH FLOOR



GROUND FLOOR PLAN

REAR OF FORT GARRY.

centre parking containing a double planting of trees, on the outside of which are driveways, also enclosed with corresponding rows of foliage. To the right of the avenue is the Fort Garry Court, to the left the Hotel with the small park forming an appropriate setting for the old Fort Garry entrance. In perfect harmony with the atmosphere of the Union Station, the Government buildings and the residential section, the Fort Garry Hotel rises majestically, presenting an artistic creation on all four facades. The exterior treatment is an adaptation of Francois I and recalls the vivid and pleasant memories of the old French chateaus in Normandy and Touraine. The style is especially practical in a country of extreme heat and cold where large heavy projections are inadvisable. The pleasing ensemble has been obtained through the use of Indiana buff limestone, which extends from the base of Canadian gray granite to the copper roofing. The main entrance is adequately marked by the broad steps and bold but harmonious marquise, built of ornamental cast and wrought iron; supported with heavy columns, consoles and square linked chains. Separate entrances have been provided for the main dining room and the bar.

The impression received upon entering the rotunda—forty-four by fifty-six feet—is a feeling akin to that of a real home life. The eye naturally sees the ensemble and appreciates at once the true atmosphere. Everywhere are scattered flower vases and boxes modelled in cream terra-cotta after the best examples of Italian work; oak divans and chairs upholstered in Spanish leather or tapestry, finished with brass studs, depicting the age of Louis XIV, which style prevails throughout the rotunda; and electric fixtures flooding the place with the light of day. The marble floor of Napoleon gray inlaid with Belgian block is given the restfulness of the other fittings by means of two large heavy hand-tufted Donegal rugs. The walls are finished with an imported artificial Caen stone of a special treatment which gives it a natural texture and takes away the harsh, smooth surface usually accompanying this method of decoration. In order to harmonize the whole of the ground floor this material has been employed on all wall surfaces of the rotunda, palm room, cafe, main dining room, and mezzanine floor. Large archways span the entire distance between the corner piers which support the balcony above, the one between the entrance and rotunda having for its keystone the shield of the Province of Manitoba; the one opposite, the Canadian emblem. The span to the left as one enters forms ample seclusion for the office, although having perfect surveillance of the main entrance, elevators and public dining rooms; the one to the right forms an open vestibule effect to the passenger elevators, affording plenty of light at no sacrifice of valuable space on the various floors. Standing directly inside the Broadway entrance, one obtains through the rear archway a view of the

DETAIL OF MAIN ENTRANCE.

MEZZANINE FLOOR, SHOWING WRITING DESKS.

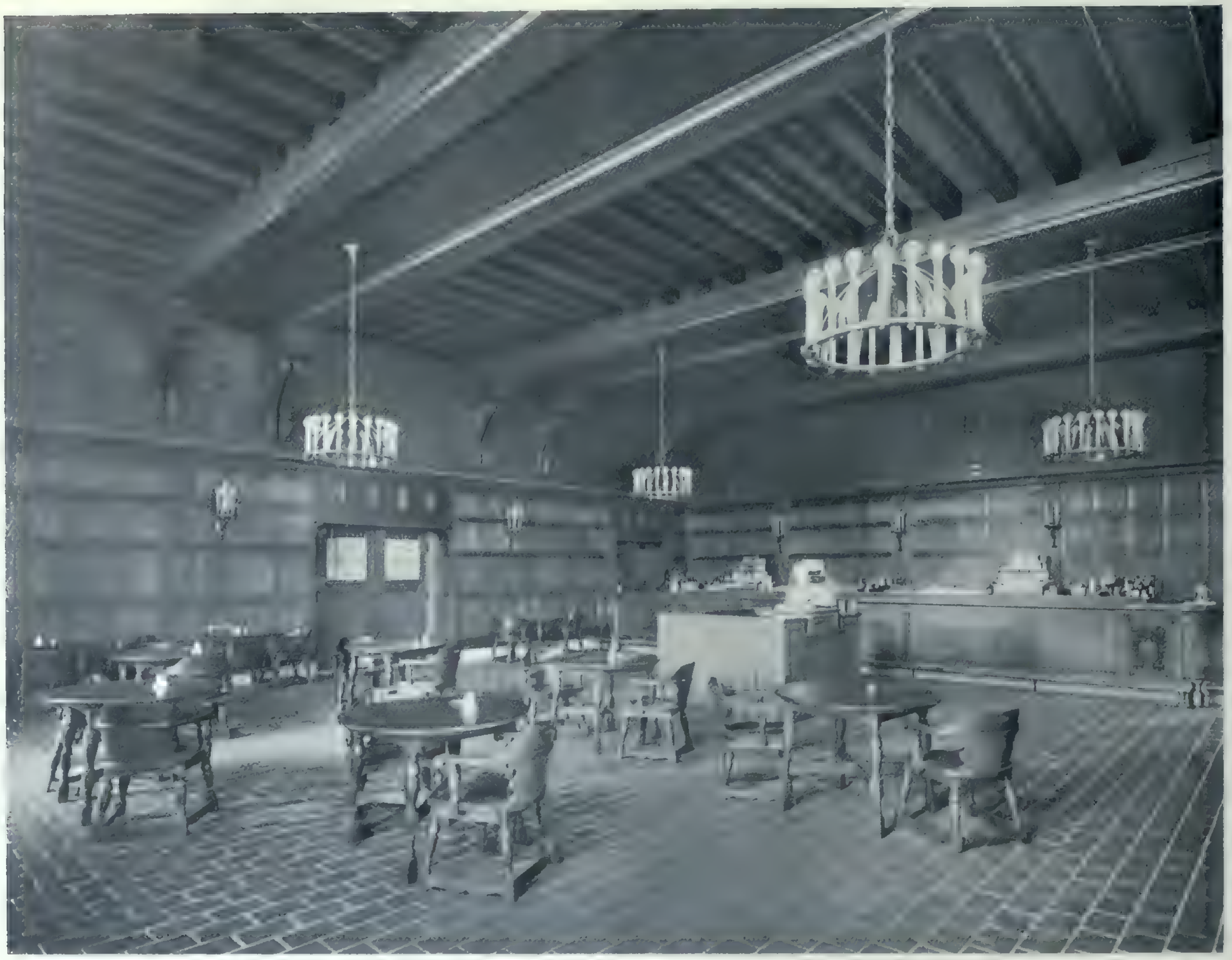
palm room, on one side the main dining-room, on the other the cafe, while directly overhead is the ornate balustrade of antique bronze, encircling the open well and drawing into perfect unison the treatment below with the enriched ceiling above.

In the rotunda facing the main office stands a master clock artistically carved in solid oak. It is fitted with an electric device for synchronizing it with the time at the Government observatory; the connection being made by means of direct wire communication. It controls the time on all clocks throughout the hotel, and operates every second a time stamp in the various departments. As everything of a business nature has to be stamped it is possible to locate and correct an error quickly, since the marking indicates the person in charge, the date, exact time to the second and the name of the hotel. The master clock is equipped with a high grade jewelled bearing movement, and operates two finely finished transmitters, which in turn strike the Westminster peal through a set of tubular bells. All of the above instruments, clocks, time stamps, etc., are self-winding.

The desk enclosing the office is of carved oak, with an artistic monogram of G. T. in the centre of the main panel; the woodwork of the newsstand, vestibuled entrance, hat racks, etc., is also of oak, panelled and moulded in keeping with the general design. Two large antique bronze fixtures hang from the ceiling, each containing thirty-six lights, while the plain panels on the wall and piers are enriched with two and three-candle light brackets. From the ceiling of the mezzanine floor hang indirect circular fixtures with alabaster bowls. To the right of the rotunda is the stairway of Hauteville marble, possessing a heavy iron bronze balustrade extremely rich in design. Commendable features of the stairs are their accessibility to all parts of the building and freedom from the elevator shafts.

The mezzanine used principally for a lounge and gentlemen's writing space is one of the chief charms upon the interior. From here may be watched the activity below in a quiet manner while resting on the deep red upholstered furniture of Louis XIV. period. The heavy red carpets partly covering the floor of Napoleon gray marble, the electric shades with florid design, the large ceiling panels in cream and gold, the Italian damask window curtains of a cardinal red, with gallon and bullion trimmings—all furnish a comfort and warmth rarely found in a building of a public nature. The windows here, as throughout the ground floor, consist of metal frames and best quality of British polished plate glass. Towards the front are small balconies, from which may be obtained excellent views of the main dining-room and cafe. Leading off from the rear is a passage containing a

MASTER CLOCK.

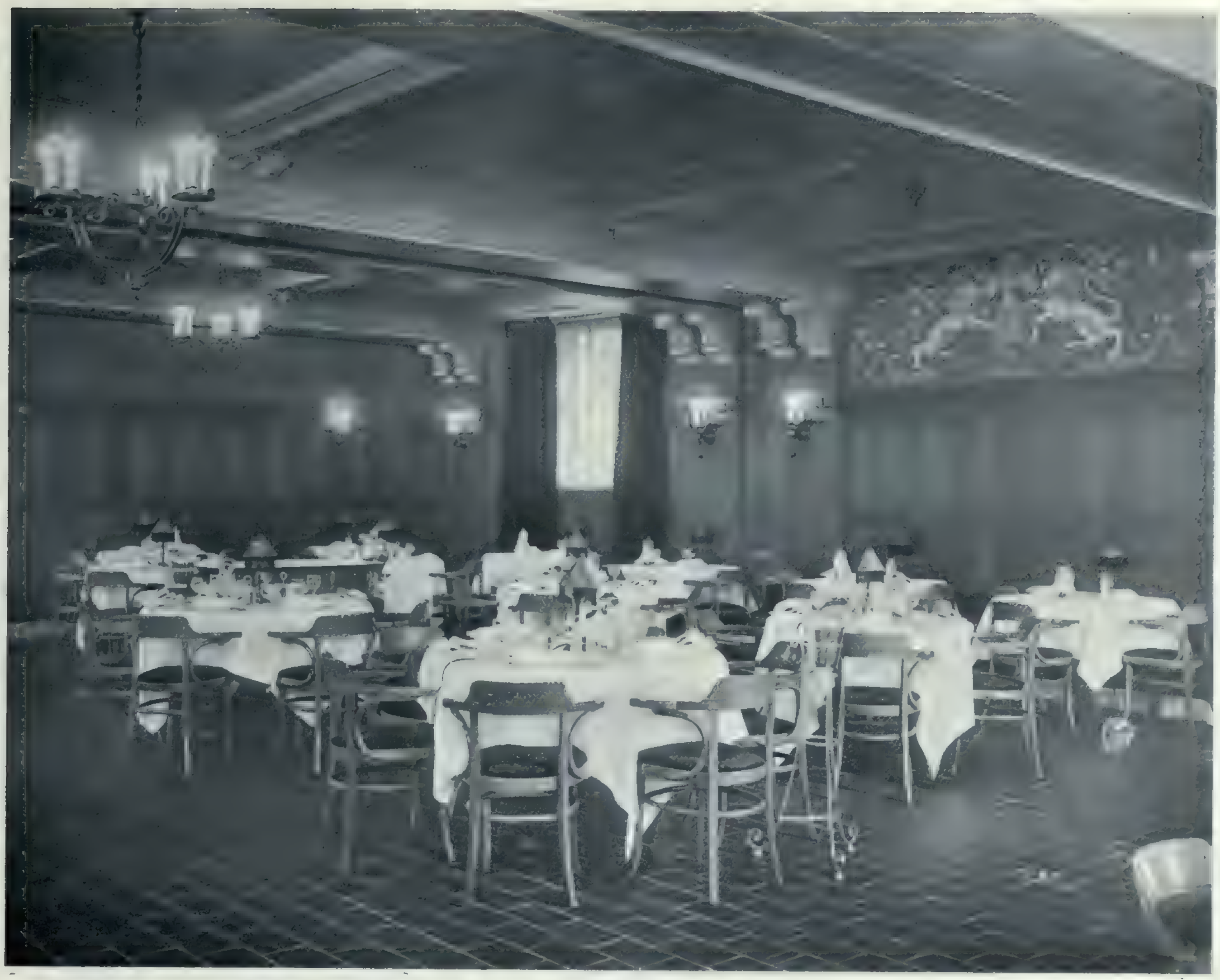


BAR ROOM.

glass dome with gilded ribs and dull green floral panels, which ends in the ladies' drawing-room, thirty by forty-two feet. The walls are hung in silk amber panels, terminating in an acanthus leaf moulding; the floor is covered with a heavy Wilton carpet of trellis design, surrounded by a border of roses and flowing leaf design in greens and pinks; the ceiling is finished in plain panelling effects, with reeded bands surrounding. Each wall panel has a three-light fixture finished in old gold, the ceiling containing clusters in a circular form. The ladies' writing room adjacent has a similar treatment, the mahogany furniture being upholstered, and the tapering legs ending in spade feet.

The architects sensed the desire of the travelling public for simplicity and dignity when they designed the main dining-room. Extending the full depth of the building and forty-three feet in width, the artificial stone reaches from the base course of Botticino marble through two storeys to the ceiling, divided into six full length panels in cream and gold. These in turn are re-panelled to accommodate an extensive series of well modelled bas-reliefs of local and national interest, the more important of which are the sunburst, Scotch thistle, porcupine, dragon, etc. The soffit of the beams are also ornamented in low relief with models of a pine cone, laurel, tulip and other features typical of Canadian life. Here is demonstrated the advisability of large window openings, which are always better in respect to lighting as well as decorating. The draperies consist of Venetian figured velvet with a straight lambrequin, the chairs of characteristic X and stretcher design with coverings fastened by brass studs, the carpet of a two-toned olive green Wilton, and all woodwork of a silver gray oak. The large electroliers hanging from the ceilings, and appliques fixtures on the walls are of antique bronze. In time when the walls mellow this room will be an ensemble of architectural refinement, possessing a quiet dignity and a harmonious charm unusual in public dining-rooms.

As stated before, the view from the main entrance through the imposing rotunda leads to the circular palm room, some forty-four feet in diameter. The room has been designed in the Adams style, with a thought towards the restful comfort of the guests, and everything was excluded which might interfere with the harmonious relationship of the tout ensemble. Covering the entire wall surface and rounded ceiling, the slightly textured Caen stone evidences the



GRILL ROOM.

charming effect to be obtained by the proper use of one material. The detail is kept in low relief, and the ceiling reflects the care taken in laying out the floor pattern, with Napoleon gray and Belgian black marble. Even the ventilating screens in the frieze have entered into the scheme in such a way as to become part of the general design. Here also is the large window treatment brought into sympathetic relationship by green and gold damask curtains. The furnishings are of birch; the rug of hand-tufted Donegal; the fountain and flower boxes, replicas of well known work. In addition to the antique finished lighting fixture suspended from the centre of the ceiling with eight clusters of seven candles each, the pilasters have bracket clusters similar in finish and style, while around the wall are placed thirteen small tables, each one having a small antique lamp. A musicians' gallery has been placed on the mezzanine floor so as to furnish music, both to this room and the main dining-room, which will in no way interfere with the conversation carried on by the diners, but rather lends itself to their enjoyment, with its soft and subdued tones. The plan of this room in conjunction with the two other rooms of the ground floor is undoubtedly a perfect arrangement for dining service, both from the point of convenience to the guest, as well as economy and efficiency to the hotel management.

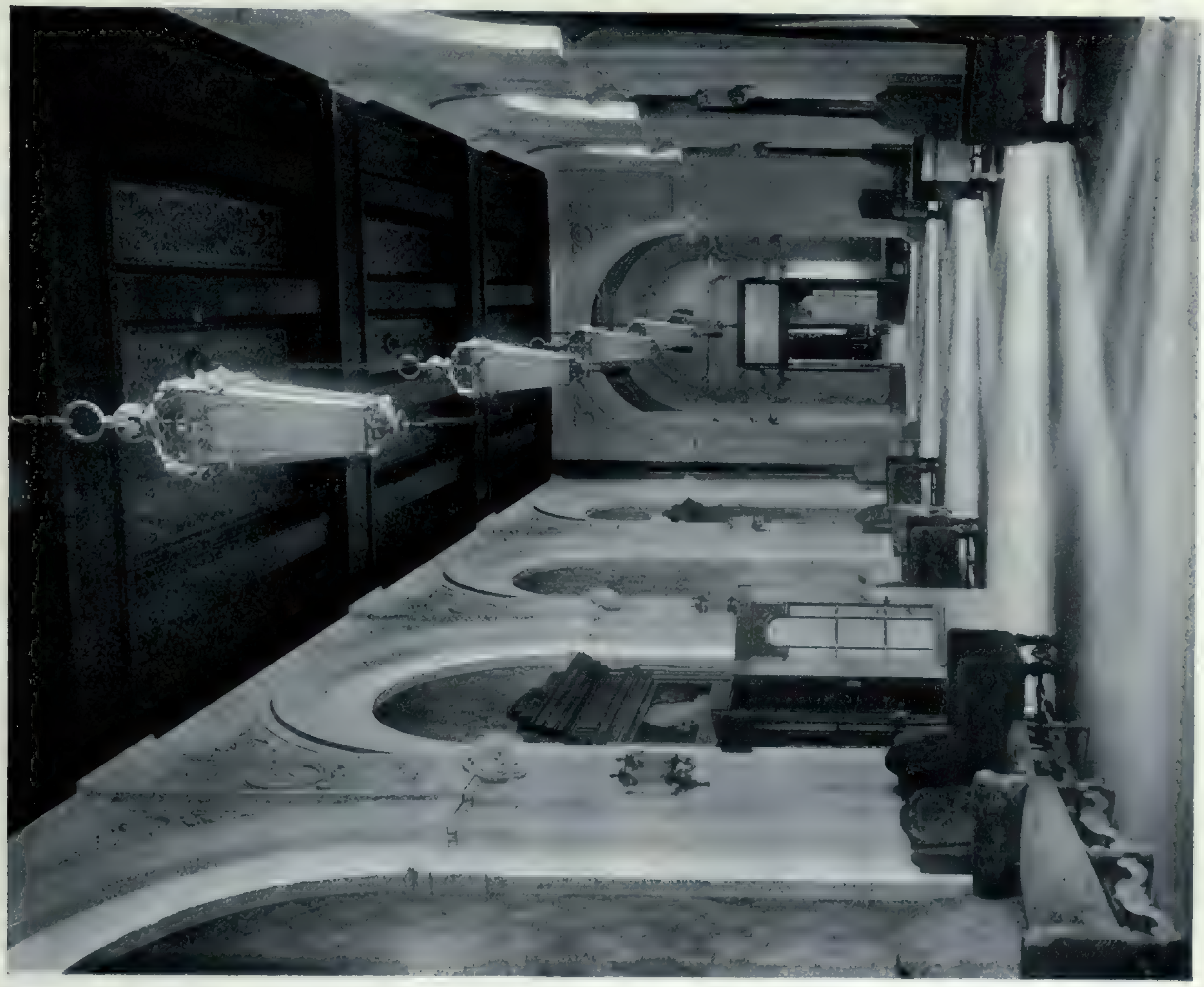
The third and last restaurant on the ground floor is the cafe or breakfast room, approximately forty-five feet square and extending through two stories. The walls have a Doric treatment with a great fret running between the pilaster caps, above which are decorative frieze panels for the accommodation of ventilating registers. Three large panels finished in gold and cream form the ceiling, each one being subdivided into squares from which are hung the inverted electroliers by a series of chains finished in antique silver. The walls have a four-foot marble wainscot, relieving the effect which might arise from an over use of the Caen stone treatment. At the thirty small tables are hardwood chairs of the Hepplewhite shield shaped back with epaulettes of silk velour harmonizing gracefully with the mulberry silk velour hangings finished in galloon and bullion trimmings. Besides the nine large ceiling fixtures are the wall brackets, each containing three lights and typical of the eighteenth century school of architecture.

SITTING ROOMS.

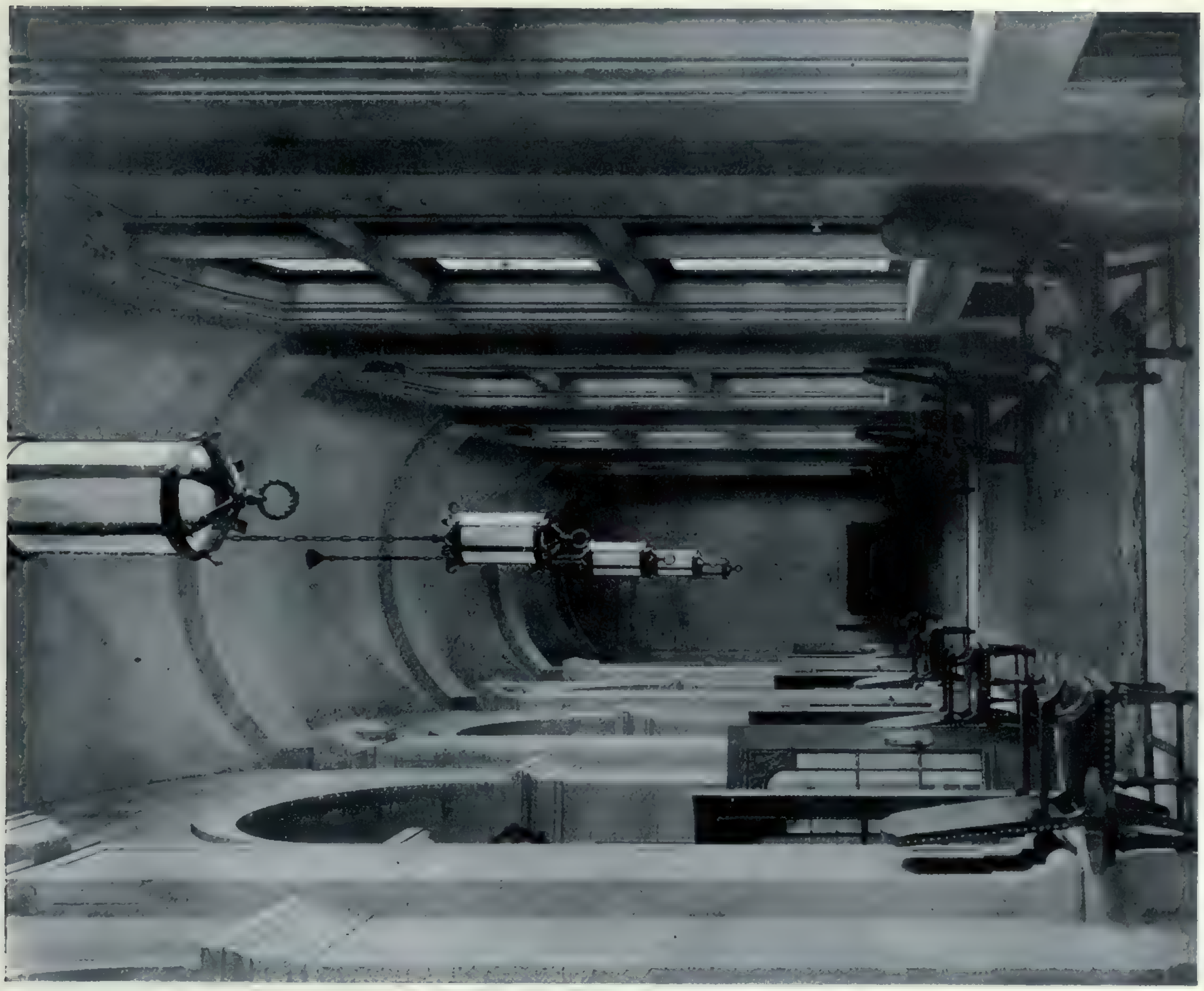
BED ROOM.

STATE APARTMENTS,
FORT GARRY HOTEL,
WINNIPEG, MAN.

BED ROOM.



FOYER.



LOGGIA.

FORT GARRY HOTEL, WINNIPEG, MAN.

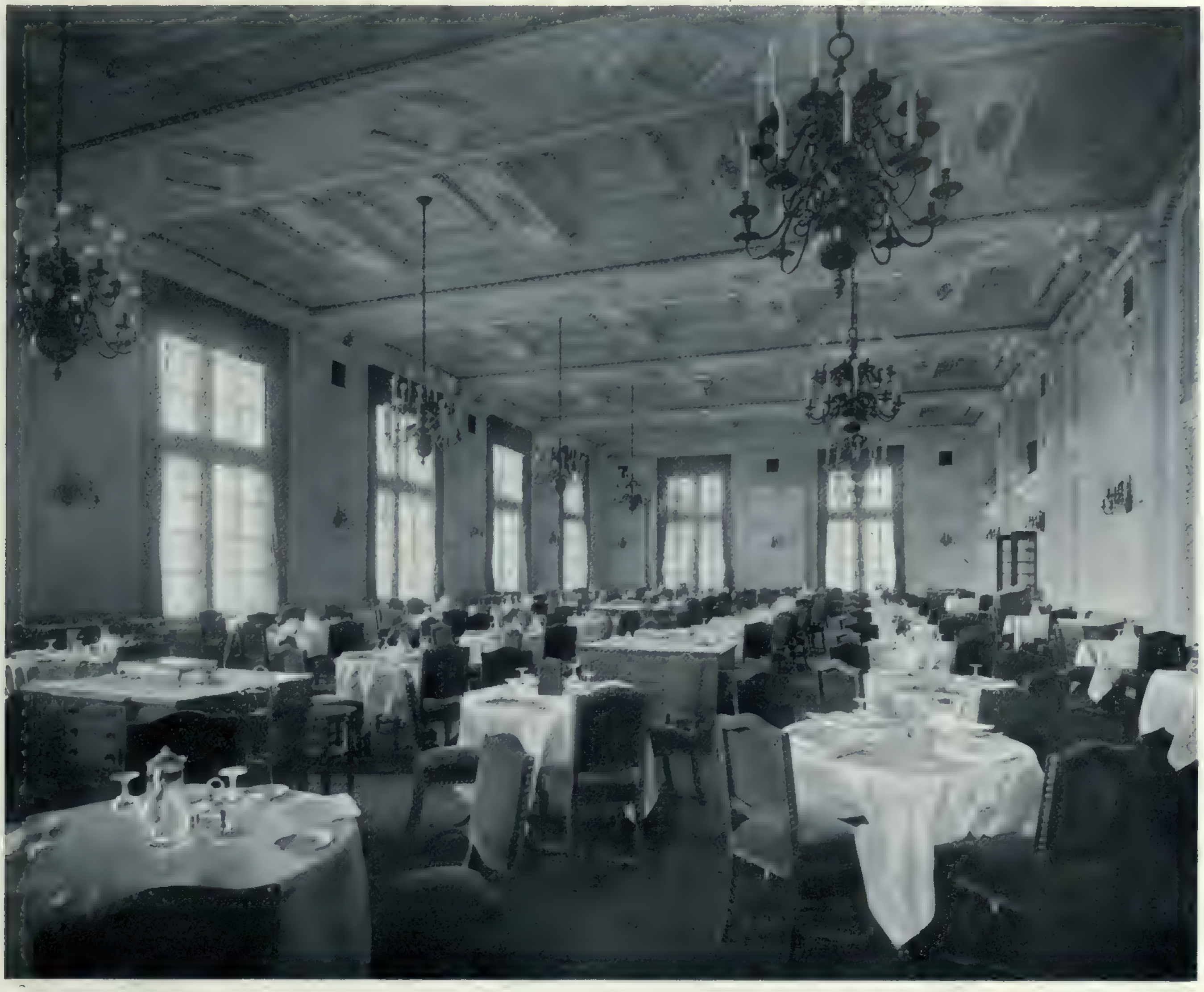
PALM ROOM.

No room is more inviting than the bar, which measures forty-three by fifty feet, effective in its good taste rather than elaborate and gaudy treatment. Above the high red oak wainscot panelled in low mouldings runs a decorative hand-painted frieze of a deep reddish tone with neutralizing colors. Every six feet is a small circle containing a sheaf of wheat, lion, cross, etc., which lend a subdued interest. Massive beams divide the ceiling and are supported with heavy brackets containing the carved likeness of the ancient gods and goddesses who guarded over the Bacchanalian interests. The tables and chairs of red oak, the windows of stained glass, and the Swedish iron lighting fixtures attached to heavy chains all add to the rich and refined atmosphere. The pavement of deep red tiling gives a finishing touch to this creation of subdued coloring and richness.

In the basement is the grill room, forty-five by fifty feet, with a double panelled wainscot of Flemish oak seven feet high and a reddish brown rough plaster frieze above. The large ceiling beams have hand painted floral patterns of subdued coloring, between which are plain buff plaster spaces. This room also possesses a warm æsthetic atmosphere heightened by the use of deep red tiling on the floor, stained glass windows with dull colored patterns, and hammered wrought iron fixtures. Near by are the barber shop and public toilet finished in marble floors and walls with alba glass in the indirect lighting fixtures.

The only feature of interest aside from the State apartments between the mezzanine and the seventh floor are the private dining rooms on the first floor. These rooms are located so as to afford the strictest privacy and at the same time most accessible to the elevator service. They vary in size from fifteen feet square to fourteen by forty-five and designed after the Jacobean period in respect to the wall treatment as well as the furnishings. Two have oak panelling extending to a frieze of appropriate fruit and floral design, one of which is artistically handled in lavender and dull yellow, while the other is in harmonious shades of gray, greens and red. The third room is decorated in mahogany with large panels extending to the ceiling—a simple but ornate ceiling. The carpet and upholstering are in a rich blue, the hardware in dull gold, with the buffalo emblem at the top of the lock and the monogram of the hotel on the knobs. The fourth room, treated in maple, contains tapestry panels encased in gold and cream mouldings, with curtains and carpet of varying shades which give to the ensemble a rich wine color. In connection

BRONZE RAILING.

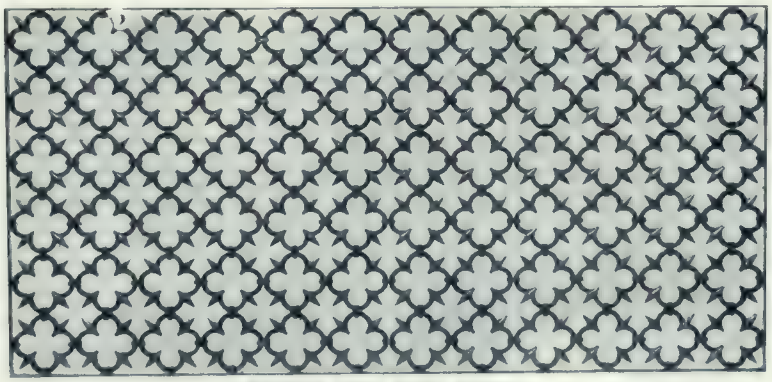


MAIN DINING ROOM.

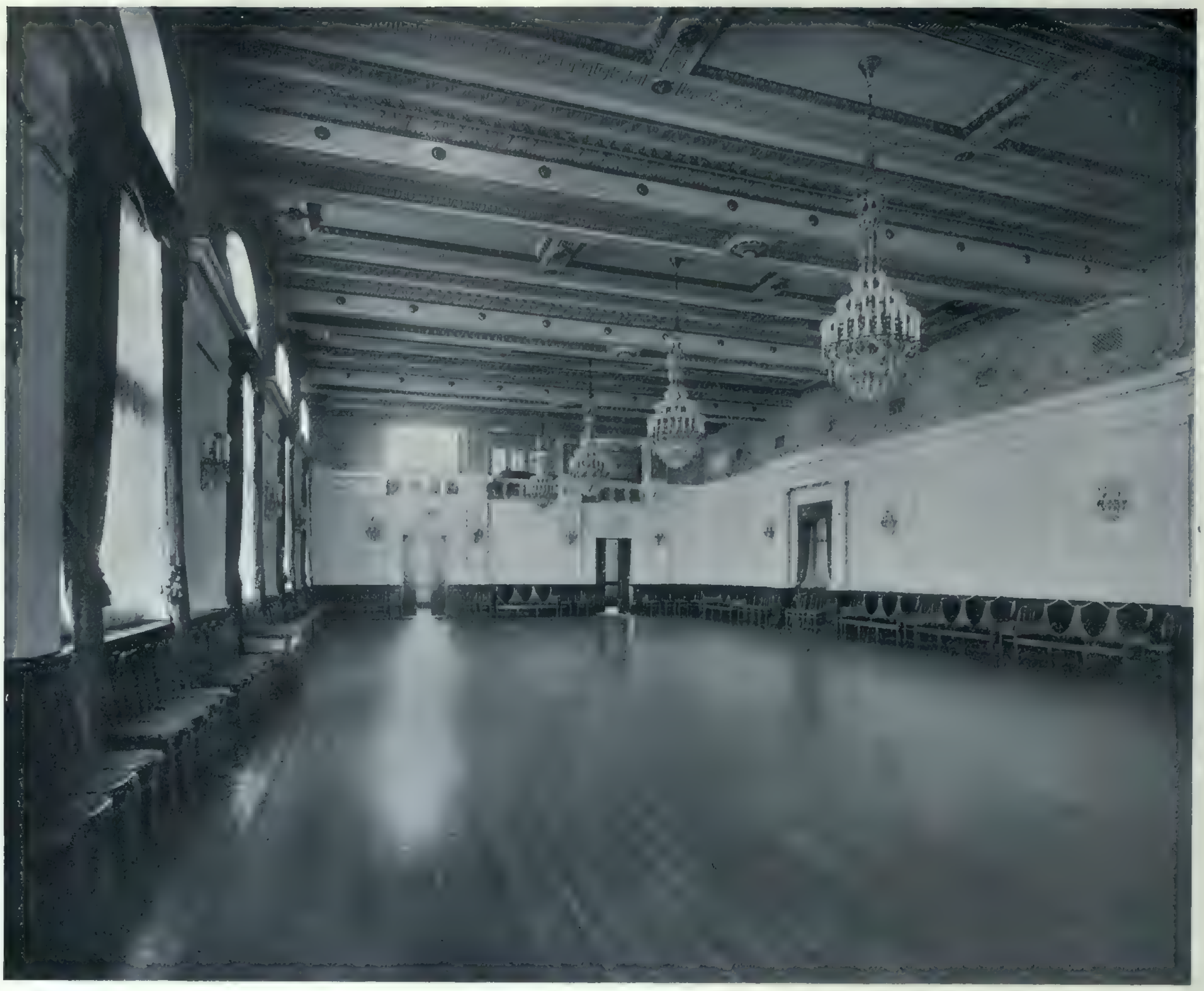
with the private dining rooms is a kitchen containing two steel dish warmers with plate shelf and doors opening on both sides; a refrigerator; glass and silver washing sinks, and rinsing apparatus. It is reached from the main kitchen by service waiter and freight elevator. The space permits of ample accommodations for the four rooms at one time and regulated in such a manner as to permit of no change in the food served.

A modern hotel in cities the size of Winnipeg must cater to the social life, and in order to meet this exacting demand the whole seventh floor has been planned accordingly. The banquet hall, which occupies the entire end of the building, will accommodate six hundred diners. A genuine warmth is felt in the architectural handling, the walls being treated in oak panelling fourteen feet high with a rough plaster above stained in harmonizing tones of brown. The large ceiling beams are painted in such a manner as to reveal the texture of the woodwork through the decorations; at the top of the large windows are leaded glass effects containing landscape views, emblematic shields, etc. From the ceiling are suspended ten chandeliers with Dutch fittings of antique brass hung from chains and each having twenty-four lights. The furniture of the William and Mary period has high backs with tapestry coverings depicting the sports and pastimes of that period. This room is used also for a concert hall and is especially noted for the acoustic properties. A stage eighteen by twenty-three feet and dressing rooms have been arranged at one end for the reproduction of plays.

The ball room, which occupies a corresponding position to that of the banquet hall at the



BRONZE GRILLE IN FOYER.



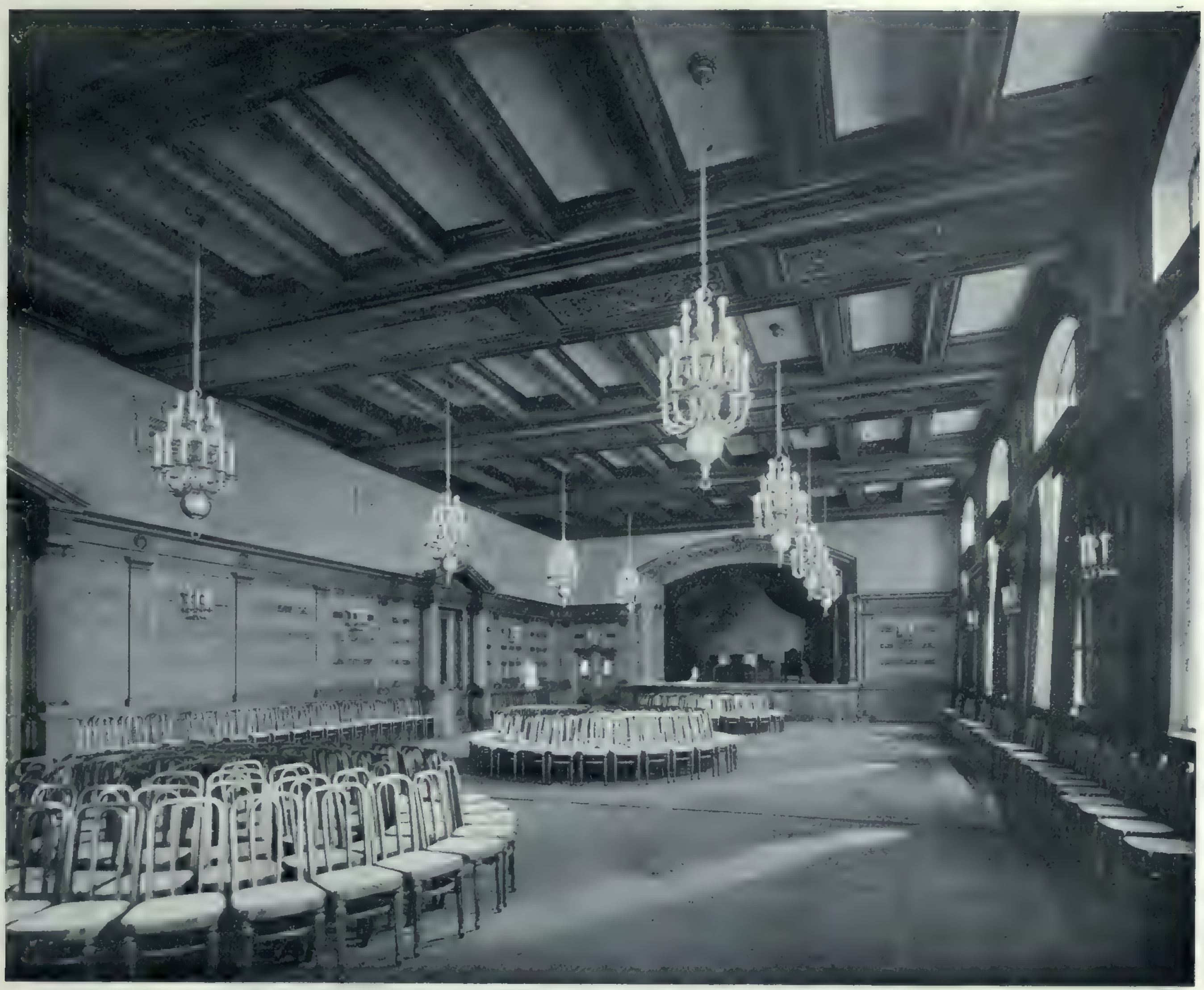
BALL ROOM.

ENTRANCE TO BALL ROOM.

other end of the seventh floor is especially pleasing in its chasteness, there being a lack of the usual gaudiness displayed in rooms of this character. Above the wood wainscot three and one-half feet high the walls are treated in Caen stone to the decorative frieze of blue field with patterned displays typifying the life of the Province. The room is well lighted in day time by the large windows, which are brought into harmony with the general effect through a stained glass, each window containing the heads of two prominent musicians; at night time the large space, forty by eighty feet, is flooded with light from the large crystal fixtures in the ceiling and wall brackets finished in old gold. The woodwork is of birch stained gray; the curtains and upholstering of blue silk velour.

At the rear is a musicians' gallery located between two card rooms, all overlooking the ball room and protected by means of an elaborate bronze screen.

Joining the banquet to the ball room and serving as a promenade and refreshment salon, are the foyer and loggia, running parallel with the main facade and connected by means of six large openings with carved oak doorways and bronze screen work above. The loggia gives the impression of an ancient cloister, being finished above



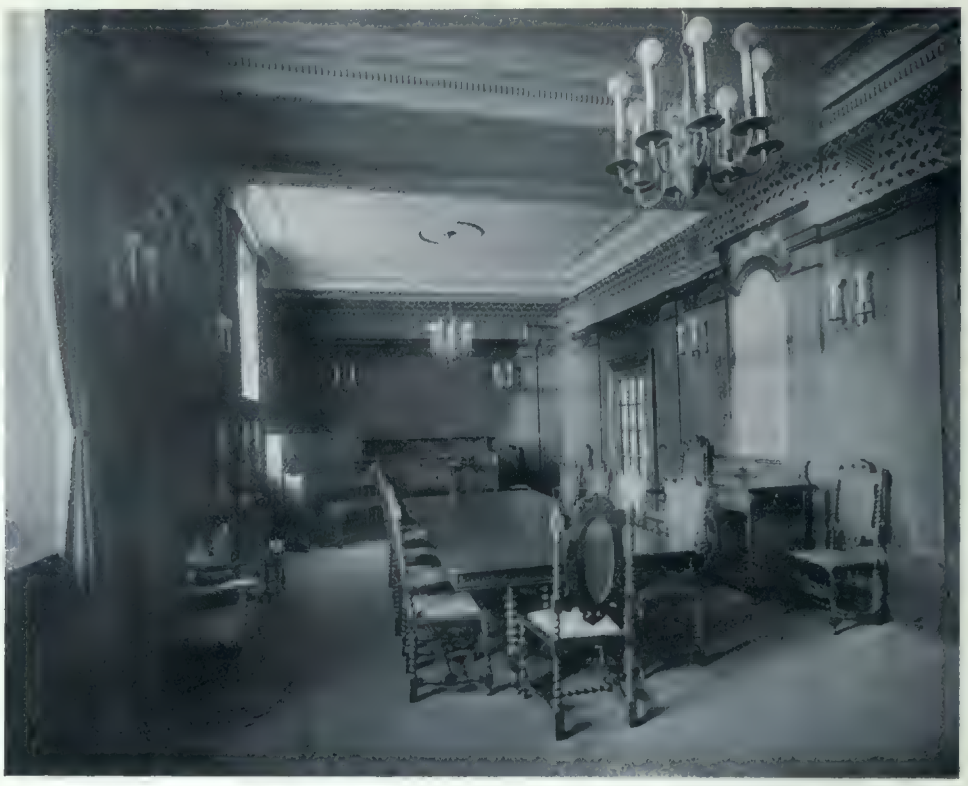
BANQUET HALL.

the marble floor in Indiana limestone with a vaulted ceiling. The windows have been constructed so that the large openings can be made clear of glass, frames, etc., in the summer time, affording an unobstructed view over the city and prairie land beyond, an interesting feature to the guests as they promenade back and forth. The electric fixtures are of wrought iron resembling a lantern of the middle ages; the furniture of carved oak after the style of Louis XIV; the carpet an Axminster of two toned brown and green. Passing into the foyer, the walls are panelled in brocatelle of flower clusters; the draperies of silk velour with French corded beadings; the floor covered with an amber Axminster carpet. Between the oak beams in the ceiling are floral paintings from which are hung artistic lights casting a rich subdued illumination over the decorative spandrils moulded in low relief and suggestive of music.

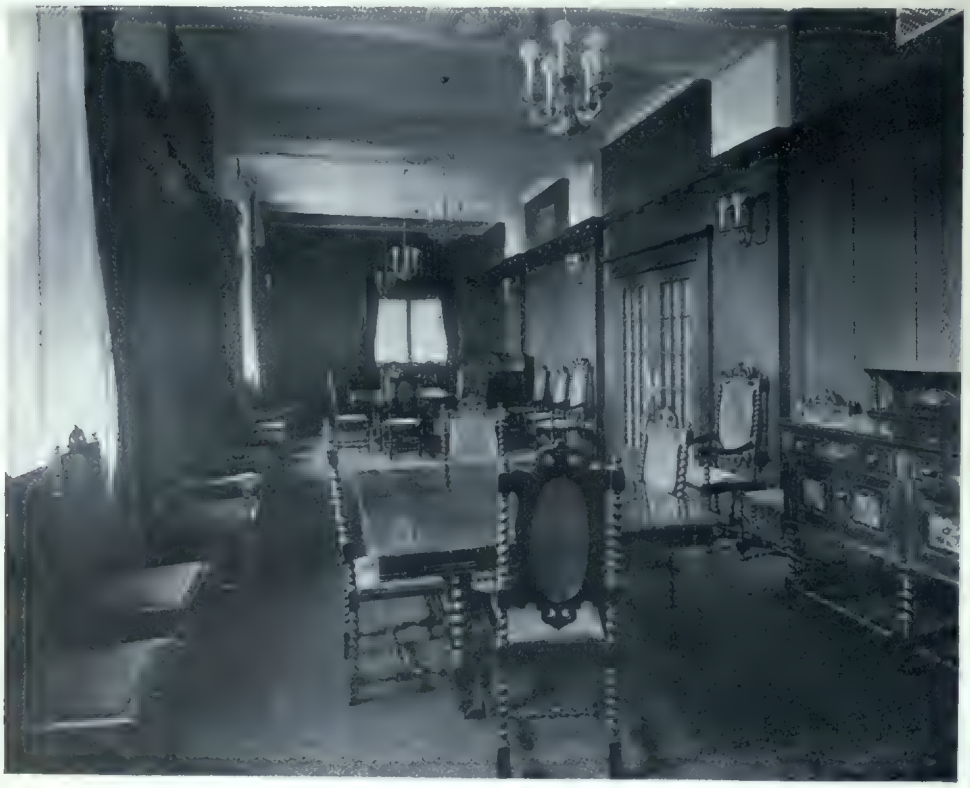
Leading from the foyer to the ladies' lounge on the floor above is a stairway whose walls are of Caen stone; the balustrade of carved oak; ceiling in panelled oak; carpet of Axminster in three shades of green. The lounge is warm and attractive in its decorative effect; the walls being panelled in Flemish oak, which material is used throughout, excepting pilasters and piers

ENTRANCE TO BANQUET HALL.

of Caen stone; the ceiling in ribbed cream plaster treatment between the oak beams; floor covered with Wilton carpet in the greenish tones; frieze above the dado in deep colored tapestry depicting the customs and costumes of the Elizabethan period. The doors are finished with linen folds, while the capitals have Gothic trefoils issuing forth from the Tudor rose. Alabaster disks and wall brackets designed in keeping with the room lend an additional charm to the ensemble. Adjacent is the ladies' retiring room, containing French prints in mirror frames against stippled plaster walls with oak trimming.



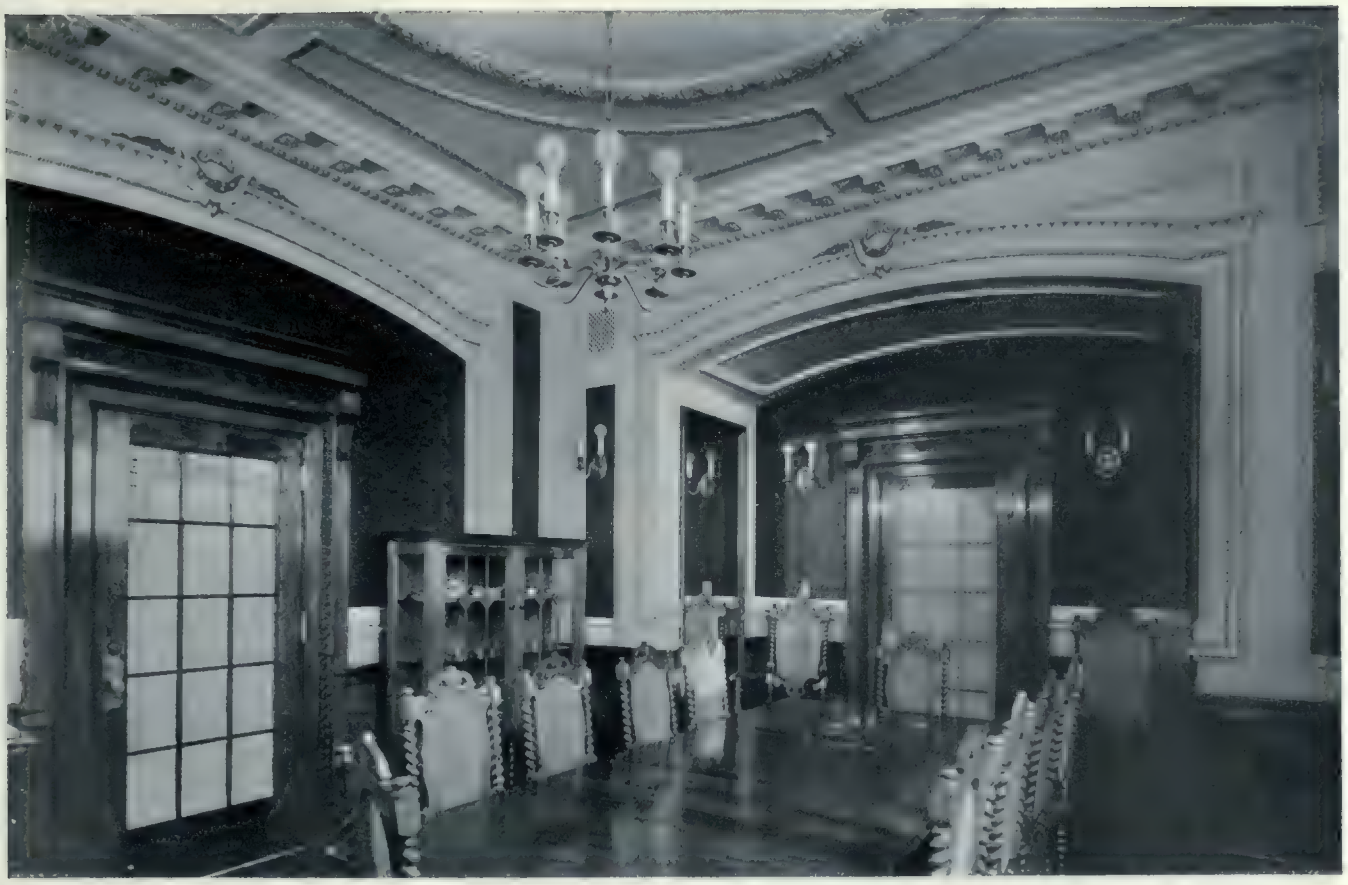
TWO PRIVATE DINING ROOMS.



The kitchen arrangement for the seventh floor is quite complete, consisting of two ten-foot iron sinks; three warming compartments with shelf surrounding; plate warmer with marble top and battery of five urns operated by steam; two polished steel cup warmers; dish washing apparatus with scraping table and canopy of monel metal; plate steel service table; three gas ranges; pancake and gas toaster. Direct communication to the main kitchen is furnished through the service and freight elevators.

In the railway hotel the typical or bed-room plan differs from other buildings of a similar nature in the number and arrangement of rooms for public and private accommodations and the bathroom facilities. Here the traveller demands the private bath and rooms of ample space. Accordingly considerable study was given to their size and shape, inter-communication, access to elevators and fire-escapes, and constant supervision by the proper persons over every room. Each floor has a clerk's desk stationed in close proximity to the elevator and main stairs, where business matters relating to that floor are transacted, and from where the entree and exit of all persons may be carefully observed. The corridors are wide, having a cement floor and mosaic border covered with heavy carpet; the stair landings having terrazzo floors of white Italian marble.

In addition to the state rooms, the first floor has twenty-three bed-rooms with private bath;



PRIVATE DINING ROOM.

the typical floor—2, 3, 4, 5 and 6—thirty-two with and three without private bath; eighth floor, thirty-three with bath; ninth floor, six with and twenty-six without bath; tenth floor, twenty-seven without bath. This makes a total of two hundred and twenty-two with and sixty-eight without private bath. Each floor is also provided with at least two public toilets. Each bed-room is decorated in Louis XV style with carved walnut furnishings, also printed linen curtains and slip covers. A warmth is given to the delicately tinted walls and ceilings by the heavy carpet which is of a red, blue or green shade in harmony with the prevailing color scheme for that floor.

Appreciating the need of proper toilet and bath facilities wherever it was impossible to give each room a private bath, one was placed so as to be directly accessible to two rooms. Each bath has a mosaic floor and dado four feet six inches in height, composed of three-quarter inch squares of vitrified ceramic mosaic with a gray body and blue border on both the floor and walls. The furnishings consist of a vitreous water closet with white acid-proof seats and cover; cast iron enamelled bathtub and lavatory equipped with porcelain enameled ware and nickel fittings; glass towel bars and shelves; nickel plated sponge and soap holders, hand rails for bath and hanging baskets. Many of the bath rooms are inside, but it has been scientifically proven that they are as good as, if not better than, those placed on the outside when properly ventilated. Louvers are cut in the door leading from the bedroom and an exhaust register placed in the ceiling, so that the current of air is always positive from the room through the bath and up the vent shaft. This

DETAIL OF DOORWAY.

not only guarantees pure air in the toilet but also furnishes a means of keeping the bedroom in the same sanitary condition. The state apartments are decorated in the Adams style, the sitting room done in mauve with mahogany furniture and lighting fixtures of silver finish; the bedrooms in old rose and green with antique ivory trimmings.

On each floor is a fully equipped service kitchen for private use having a direct connection with the service and freight elevators. In addition to a polished steel warmer and four-gallon hot water tank there is a refrigerator cooled by brine coils receiving its circulation from the main plant in the sub-basement.

DETAIL OF ROTUNDA.

In designing the kitchen, cleanliness and efficiency are of extreme importance. The proper location of the dining-space in relation to the accessibility of the kitchen and service departments have great bearing on the economical aspect as well as the entire satisfaction to the guest. Its size and position at the Fort Garry was carefully considered from the first, as a result an extremely satisfactory scheme has been planned for the complete service throughout the hotel. The communication between the kitchen and the dining-rooms are arranged so that there is no interference between waiters or noise to disturb the patrons; in regard to the main dining-room, there is a flight of stairs leading direct to a small serving room adjacent. The ceiling is high, giving plenty of light; the walls are of white glazed tile; the floor of large red tiling with ample floor drains for cleansing purposes. The kitchen is practically divided into the clerk's checking space in which are located the three rooms for silver, glass and dish washing, the service bar and the still room; the main kitchen where the roasting, broiling, etc., is done; the baking department for bread, pastries, etc.; the butcher shop; the general liquor storeroom.

The dish washing department is separated from the kitchen proper, and located in the space between the waiters' entrances from the dining-rooms; the silver and glass each having a room aside from the china, all equipped with sinks, sterilizers, tables and shelves, the china division having in addition a dish-washing apparatus with canopy over and scraping table with recessed top. Facing these with a direct command of every waiter is the checking desk. To one side is the still warmer with marble table and five urns, gas toaster, automatic egg cooker, refrigerator, racks, etc.

In the kitchen proper is a series of ranges and broilers standing free from the wall with ample room on all sides. A low partition of white tile separates them into two rows, over which is a ten by forty-five foot monel metal canopy with a row of lights inside of the hood at the lower end. On one side are seven fire and oven ranges of extra heavy steel, fire boxes and ovens lined with Scotch fire clay over which is a double plate shelf; three gas salamanders; two charcoal and one gas broiler. On the other side set in steel drip pans are three aluminum steam jacket kettles and one upright steam cooker weighing thirteen hundred pounds; also two vegetable cookers, a forty-gallon cast iron grease kettle, an electric driven sauce machine and a section oven for special work. Along the wall next to the range are stationed a fourteen inch deep heavy galvanized iron sink, a vegetable peeler with motor and water connection, a twelve foot pot sink of wrought iron containing

GALLERY OF BALL ROOM, SEVENTH FLOOR.

two compartments, and an iron sink for milk cans four feet square. Facing the opposite side of the range are placed a polished steel top cook's table five feet wide with shelves, two bain marie and a hot and cold water sink, carving tables with pot rack above, two steel top plate warmers with steaming shelf and tray warmers at the end.

To the side of the main kitchen is the garde manger's department equipped with serving and working counters, sinks and refrigerators; adjacent to this is the butcher shop containing six tables, block, electric driven mincing and sausage machines, enamelled sinks and refrigerators for meats, fish, etc. In front of these and in close touch with the kitchen are the pastry and bake shops. The pastry room is furnished with two marble top tables, combined gas pan cake, waffle and cup warmer with canopy above, candy furnace, fifteen gallon copper jacketed kettle, bake oven, ice cream freezers, icing mortar of solid marble, sauce mixer, sinks, tables, shelves, etc. The bake shop contains two work tables, cast iron dough mixer, steam oven, flour tins, thirty-gallon copper pastry kettle and polished steel steam proving oven. The oven is constructed of thick brick walls capable of distributing and retaining an even amount of heat. Over hermetically sealed tubes of three thousand pound pressure test is sprayed steam from perforated pipes which makes a dry steam for French rolls and bread. All wooden tables of ash and oak; all salamanders lined with brick to retain heat. An oyster pantry is also provided with cookers, steamer, baker, sinks, refrigerators and plate warmer.

Throughout the kitchen are large refrigerators for meats, fish, oysters, creamery products, fruit, vegetables and liquors connected with a cold storage system. The refrigeration plant consists of two fifteen ton double-acting ammonia compressors, each one driven by an automatic valve steam engine, having a cooling capacity of fifteen tons of ice per day, fitted with double pipe condenser, hot gas entering at one end and cold water at the other. The brine coolers are twelve pipes high, each pipe being two and three inches. This plant furnishes a continuous supply of cold brine throughout the hotel and in each quarter the temperature can be regulated to suit the various needs. On the roof is placed a five-ton condenser piped through the building to charcoal filters placed in series and double pipe-cooling coil.

The cold water is supplied from an artesian well three hundred and fifty feet deep and from the city supply. Both services are connected with a water softening plant and can be used in conjunction with each other or separately. After being discharged into an auxiliary tank located in the basement it passes into a water softener of six thousand gallons capacity per hour with settling tanks ten feet in diameter and twenty-two feet high. From here it is pumped to two cold water storage tanks of 6,500 gallons capacity each, equipped with a six-inch connec-

LADIES' WRITING ROOM.

tion for house supply, the outlet being some inches above the bottom in order to prevent any sediment from entering the system. Further arrangements have been made through cross connecting valve lines to use soft water for boiler room and laundry in addition to hot water service, and hard water throughout the rest of the hotel. The piping consists of galvanized cast iron protected with sectional asbestos one inch thick and a canvas duck cover.

The hot water is supplied at a pressure maintained by the house tanks and generated by three hot water heaters made to withstand a pressure of two hundred pounds to the inch and sufficient copper tubing to heat the water 180 degrees F. The house supply is forced to the ninth floor ceiling where it connects to a horizontal system of piping; the risers are extended down to sub-basement ceiling and carried to main heater, forming a complete circulation. The kitchen and laundry supply as well as that for the barber shop and main lavatories is installed on the ceiling of the sub-basement, one of four thousand gallons capacity per hour, the other five hundred gallons. All three systems cross connected to allow of one or all operating at the same time. The piping is of seamless drawn brass covered with eighty-five per cent. sectional magnesia one inch thick; the heaters are protected by two inch magnesia wired on and coated with a hard plastic substance.

LADIES' DRAWING ROOM.

Five supply and nine exhaust fans are installed for the indirect heating and ventilation system. Two fans, each of 25,000 cubic feet capacity per minute take care of the ground floor, mezzanine, grille, barber shop and public toilets. The air enters through copper louvers with one-half inch wire mesh, tempered by passing over cast iron steam heaters, filtered through cheese cloth screens, and reheated by coils of sectional heaters to the desired temperature by thermostatic control. The air enters the rooms near the ceiling and is drawn out through ventilators at the floor by two exhaust fans at the roof. The seventh floor has a supply fan of 25,000 cubic ft. capacity and exhaust of two fans, 10,000 capacity each, all of which are located on the roof. Two fans, located at engine mezzanine floor, supply kitchen, laundry, bar, engine, boiler, wine and pump rooms; air admitted as already described, except in the boiler, where it is discharged so as to blow directly on the firemen. A special exhaust fan in sub-basement discharges the foul air from ceiling of boiler and engine rooms; two fans on the roof take the remaining portion of the kitchen service, while two fans are used in the toilets and private baths on all floors as mentioned above.

CLERK'S DESK IN KITCHEN.

In the main rooms the air is changed every eight minutes, although the fans permit of a twenty per cent. increase of speed which in turn produces better ventilating facilities. Galvanized ducts lead to the registers which are equipped with a damper controlling the amount of air supplied or exhausted. The condensation from the radiators and heating coils passes to a tank three feet in diameter and ten long, where the air is separated from the water which is forced by a vacuum pump into a feed water heater, from where it is sent to the boilers by feed pumps. The vacuum pumps also maintain a partial vacuum in the piping system connecting the radiators with the receiving tank.

Four boilers of three hundred horse power each, have been installed, which are internally fired and produce a rapid circulation by means of a plate at the front, which compels the water from the drum to pass around the shell and rise between the furnaces and among the tubes passing to the rear.

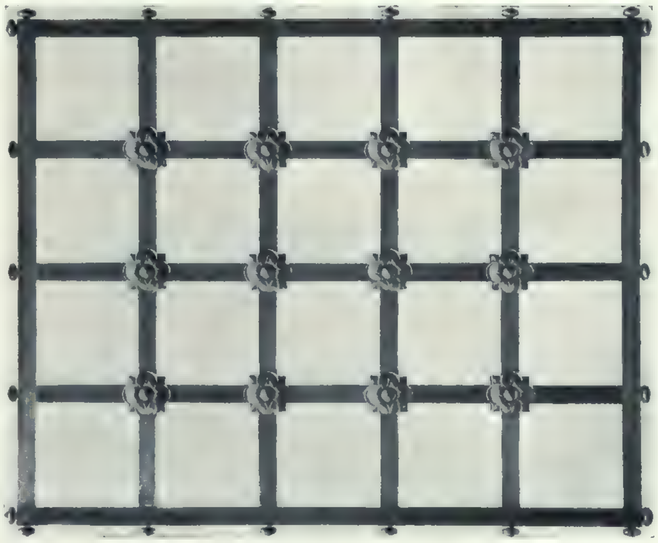
Three sewerage ejectors with a capacity of one hundred and fifty gallons per minute are located in a pit under the boiler room floor. The ejectors are connected to the compressed air tank in the boiler room and have a three-inch vent pipe extending to the roof.

An adequate system of fire proofing has been adopted by means of a pump with four inch rising lines from which branches lead on all floors to a hose rack having one hundred feet of linen hose with nickel-plated nozzle.

BARBER SHOP.

A set of spherical nickle plated copper sterilizers have been provided, the upper one being sixteen inches in diameter, the lower one twenty. They are equipped with steam connections and furnished with pressure gauges, safety valves, etc.

The building is thoroughly fireproof, the steelwork non-expansive, the partitions of terra cotta, floors of marble, tile or cement, and stairways of metal. It was erected and completed under the direction of the architects for the Grand Trunk Railway System, Ross & Macdonald. The following well-known companies furnished material for the Hotel, all of which have been instrumental in giving to Winnipeg one of the best structures in Canada, both from a practical and artistic standpoint: Cluff Bros., toilet and bath-room fixtures; Estey Bros., ornamental bronze work; International Varnish Co., Ltd., elastica varnishes and kleartone stains; Linde Canadian Refrigeration Co., refrigerating machinery and cork insulation; McNulty Bros., Ltd., plain and ornamental plastering, imitation caen stone, metal furring and lathing; Otis Fensom Elevator Co., passenger and freight elevators; Pedlar People, Ltd., lath and corner beads; Stinson-Reeb Builders' Supply Company, Ltd., medusa waterproofing; Tiffany Studios, decorations and lighting fixtures; Tuttle & Bailey, registers and grilles.



GRILLE IN PALM ROOM.

While many architects place emphasis on the exterior design and others neglect the general appearance for the plan, it is extremely satisfying to see a building handled with proper attention paid to both. Much credit is due the Grand Trunk Pacific Railway for securing a hotel that is not only imposing but which embodies the essentials of a modern, up-to-date home, catering to the needs of a fickle public.

BRONZE RAILING IN MUSICIANS' GALLERY.

CONSTRUCTION

A · JOURNAL · FOR · THE · ARCHITECTURAL
ENGINEERING · AND · CONTRACTING
INTERESTS · OF · CANADA

FREDERICK REED, Editor

H. GAGNIER, LIMITED, PUBLISHERS
Corner Richmond and Sheppard Streets,
Toronto - - Canada

BRANCH OFFICES:

MONTREAL—171 St. James Street
WINNIPEG, MAN.—13 Royal Bank Building
CHICAGO—People's Gas Building
NEW YORK—156 5th Avenue

CORRESPONDENCE.—All correspondence should be addressed to "CONSTRUCTION," Corner Richmond and Sheppard Streets, Toronto, Canada.

SUBSCRIPTIONS—Canada and Great Britain, $3.00 per annum. United States, the Continent and all Postal Union countries, $4.00 per anum, in advance. Single copies, 35c.

ADVERTISEMENTS—Changes of, or new advertisements must reach the Head Office not later than the twentieth of the month preceding publication, to ensure insertion. Mailing date is on the tenth of each month. Advertising rates on application.

CONTRIBUTIONS—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and duly returned.

Entered as Second Class Matter in the Post Office at Toronto, Canada.

Vol. VII Toronto, June, 1914 No. 6

CURRENT TOPICS

CHADWICK & BECKETT, architects, formerly located at 18 Toronto street, have moved their offices to 132 Church street, Toronto.

* * *

IN discussing the lift bridge at Kamloops, B.C., in the March issue of CONSTRUCTION, reference was made to the supervision of same by H. L. Johnston, Divisional Engineer, C.N.P.R.R. Mr. Johnston did not have charge of the construction work, excepting the grading adjacent to the bridge.

* * *

IT has been decided to transport the two giant statues of Rameses II from ancient Memphis to Cairo, where they will be erected in the new Station Square that has recently been made. Considerable repairs will have to be done to one, if not both, of the statues, as it is feared that the legs will not be strong enough to support the bodies. Special arrangements are being made for the transport to Cairo, and the State railways are constructing special trucks and adjusting the line at various points, such as the stations, where it is not wide enough. The total cost of erection and transport is at present estimated at $50,000. There is no doubt that Lord Kitchener's idea was to move them to the Station Square, and that it is far better to erect these statues on a site where they can be appreciated than to leave them lying at Memphis, which is not the original site, and where one of them, at any rate, is at present on its back.

* * *

UNDER the auspices of the Government of Alberta, the Alberta Town Planning and Housing Association will hold a convention in Calgary, June 16-18. The feature of the conference will be the consideration of a proposed Housing Bill for the Province of Alberta along with the exhibition of the Mawson plans for Calgary and civic schemes for various cities in the Dominion.

* * *

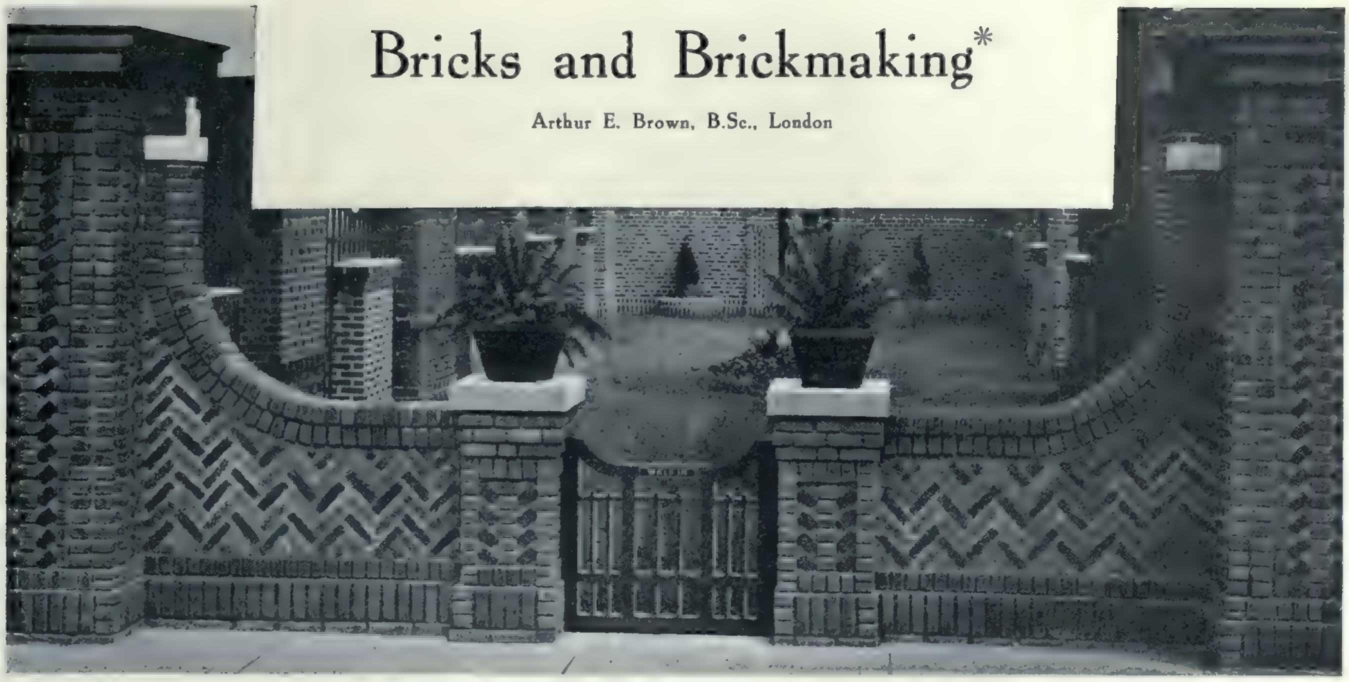
CONSTRUCTION work on the $300,000 Canadian pavilion at the Panama-Pacific Exposition was started in February. Colonel William Hutchinson, Commissioner-General of the Dominion of Canada, announced that the building will be completed by October 1. The $300,000 to be expended upon the building is one-half of the total appropriation of Canada, but a large amount will be raised by the various divisions of the Dominion. British Columbia is now subscribing a large fund for the purpose of sending an individual exhibit to the Exposition.

* * *

THE ONE unnavigable link in the chain of lakes and rivers between the Northwest and the East occurs at Sault Ste. Marie, Michigan, where, in the rapids of the St. Mary's River, the waters of Lake Superior drop eighteen feet to flow into Lakes Michigan and Huron. At the present time there are three locks for lowering ships from Lake Superior to the Lake Huron level or elevating upbound vessels. On an average, one hour and fifty-nine minutes are required to "lock" a boat, including passage through the canal. But there is often considerable delay owing to congestion arising from fogs and other nonpreventable causes. Immediately after the severe fogs clear away sufficiently for safe navigation, ships hasten to the locks in such large numbers from both directions that the three available locks, although operating at their utmost capacity, cannot meet the sudden rush, and late arrivals must often wait eight to ten hours for their turns. When it is mentioned that each minute a loaded ore-carrier lies idle costs the better part of a dollar, one can readily appreciate the incentive which has actuated the United States Government to relieve this congestion and, incidentally, facilitate the normal handling of Great Lakes traffic by building the two largest locks in the world.

Bricks and Brickmaking*

Arthur E. Brown, B.Sc., London



THE materials of which bricks are made are in every sense common and perhaps for this reason alone the trade of brickmaking is generally looked upon as a low grade and common one. The uninitiated man says and thinks bricks are easy to make. You dig a lump of common clay, put it into a heavy and ungainly looking machine made mostly of common cast-iron, the wheels go round and out come bricks, which only require baking and they are ready for use in their millions. A simple proposition, indeed! Yet, I would remind you that immense sums of money have been lost, and very few fortunes made by this apparently simple business.

Clay, the staple material (not a mineral, by the way, in the legal sense), is found in many varieties in all parts of the globe, and the most important consideration of all in manufacture is the large bulk of material used and manipulated for a small ultimate return. The many varieties have as many various characteristics, and the problems of the business consist chiefly in discovering the best methods of utilizing these characteristics to the best advantage and overcoming those that are technically objectionable.

GARDEN GATE.

Geology.—Clays are found in two categories geologically, surface clays and geological deposits. The first named are those of more recent formation found in all parts of the world in comparatively shallow beds which have been deposited by ice, rivers or lakes in what is called the Pleistocene period. Such prehistoric remains as are found in any of them belong chiefly to the animal kingdom. These are not frequent, and consist usually of bones of large mammals.

The geological clays are of varying age. It may be sufficient to note further that clay in general is the product of the decomposition or disintegration of granitic or other igneous rocks and that all clays possess certain chemical and physical properties in common.

Chemistry.—It is frequently supposed that chemistry must play an important role in brickmaking. This is true, obviously to a certain extent, and in some branches of claymaking its importance is great. In the more ordinary use of clay for brickmaking, chemistry is, however, of comparatively meagre value.

Chemistry tells us that clay is a compound of silica and alumina in fixed chemical proportions. It is what is called a hydrated silicate of alumina. Chemically, clay is this and this only, but in nature clays present almost infinite vari-

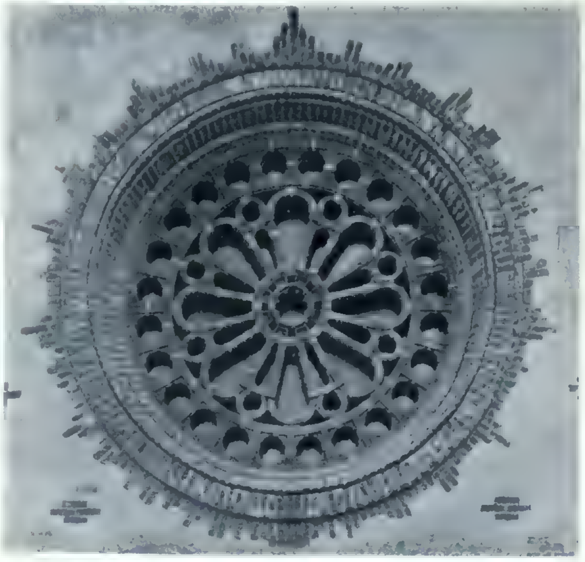
---

*Delivered before the Society of Architects, England. The illustrations do not refer to the text matter, but exemplify the various uses to which bricks are adapted.

ENTRANCE TO CHURCH.

ety by reason of the presence of other substances. They contain free silica or sand in widely varying proportion. They contain also free oxide of iron, to which the red color of the Suffolk brick and the blue color of the Staffordshire blue brick are due.

They contain alkalies,—potash and soda, refractory earths,—magnesia and lime; many contain small quantities of oxide of titanium, a so-called rare earth. These are all in comparatively small proportions, and whatever plastic clay we analyze it is found to contain somewhere in the neighborhood of 85 per cent. of silica and alumina. Silica is sand. Alumina is the oxide of that peculiar light untarnishable metal aluminium, which has given chemists so much trouble to produce commercially, and metal workers so much trouble to handle and fashion for use. The few other materials found in clay have far less influence on the final product than does the varying physical condition of silica and alumina.



ROSE WINDOW.

The presence of iron oxide has effect on the color, and the presence of lime also. The presence of lime and alkalis have marked effect on the fusibility of the clay under great heat. In these matters, chemical analysis is of assistance to us, but even so, practical examination will tell us all we need to know in these respects without analysis. The presence of water which can be measured by analysis interests us only when we turn to a physical examination of the properties of clay.

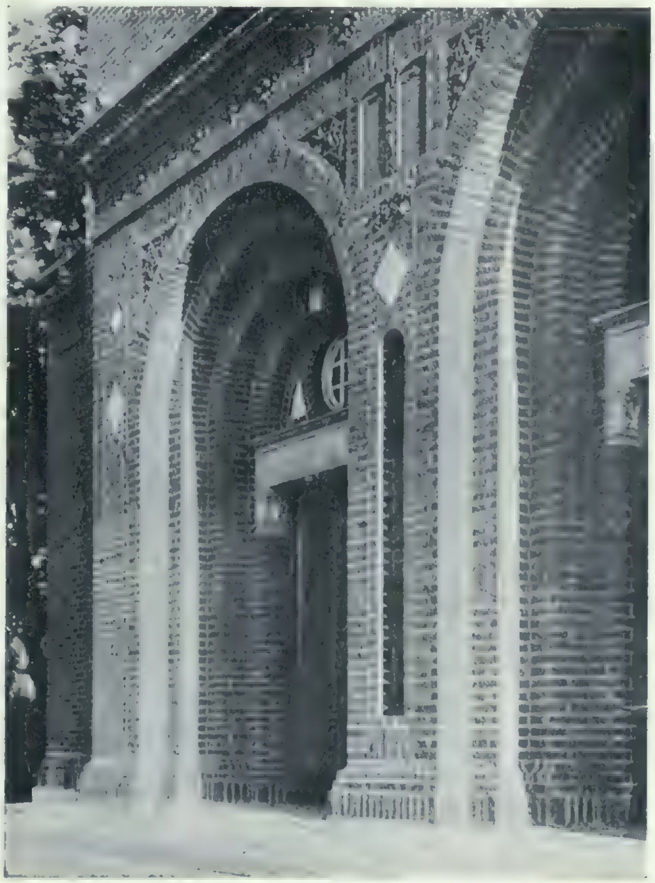
Physics.—Clay is unique, though to many it is only dirt, because it is the only substance found in nature possessing the property of plasticity, by virtue of which clay may be changed in form without breaking up or destroying its continuity, or may be joined without the use of any cementing material. In nature, most clays are only in a semi-plastic state, and become quite plastic when water is added to them. The purer the clay the more plastic it is in the natural clay beds, provided the silicate of alumina is in a state of division sufficiently fine. It would seem that this important property is due to the fact

DETAIL OF BARGE OFFICE, NEW YORK.

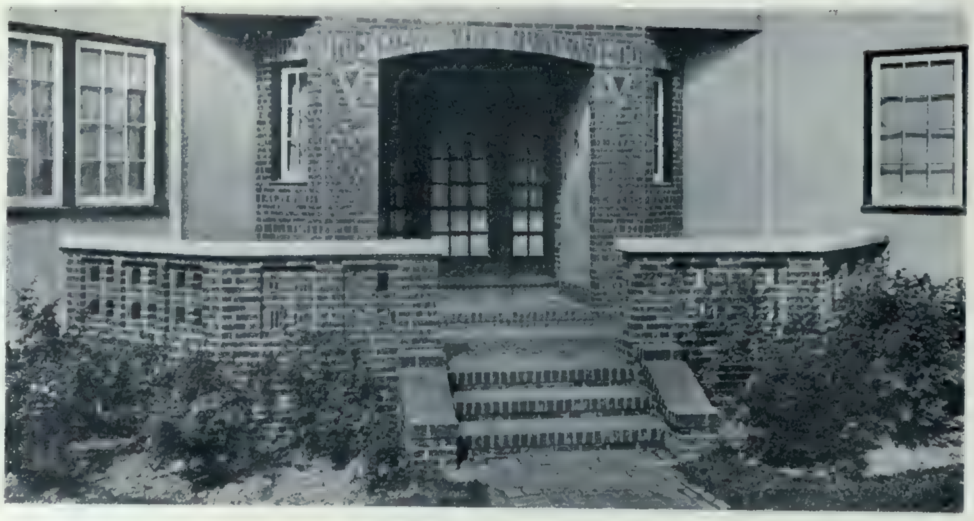
that silicate of alumina can absorb water in large volume, at the same time becoming gelatinous and swelling up. It is this property that makes clay impermeable to water. From this explanation we can easily understand that when clay is dried and the gelatinous particles lose their water they become less in volume and shrink.

We all know that clay shrinks in drying because of the way clayey soil cracks in summer time. It is also pretty widely known that the more "sticky" the clay is the more it cracks when dried. This, it is apparent, is because it is purer and contains more of the gelatinous silicate of alumina in a given volume than a sandier clay or loam which shrinks less in drying. It will be clear, then, that a sticky or strong pipe or tile clay shrinks more in percentage than a sandy clay, but there is more in the matter than this. Given a sandy, less sticky or "milder" clay, the amount it shrinks in drying depends also on the shape and size of the sand particles. These are surrounded by the gelatinous material when wet, and at a certain stage in drying, they come so close together in the mass as to touch each other. Now, if the sand grains are rough and angular, their further movement is arrested, whereas if fine and round they can slide on one another into still closer positions, and so shrinkage continues further.

When a clay with fine round sand grains dries, shrinkage goes on till arrested by the grains getting as close together as is possible,



ENTRANCE TO TEMPLE.



ENTRANCE TO HOUSE.

but still the gelatinous pure clay surrounding them goes on shrinking, with the result that spaces or pores begin to be formed in the mass, into which air enters. We thus arrive at another condition in which the pores formed in the clay gradually lose water throughout the whole mass. The size of these pores depending on the size and shape of the grains, we get two different states in different kinds of clay. The one is called porosity and the other permeability. They are only different degrees of the same thing, but they are interesting to the brickmaker because of the difference in quality of the brick produced and the different results obtained by different processes of manufacture.

All clays found in nature become porous when dried, but those with the larger angular grains are permeable even before drying. This peculiarity is of great importance in a building, for the striking reason that a permeable brick will better resist the weather and will also "breathe" or allow air to pass through the walls. This is easily understood and is illustrated by a simple proposition. Take a glass tube with a bore of say one-eighth of an inch, or a straw, and one can easily blow through it. But take the broken stem of a thermometer which has a very fine bore and it is not possible. The pasage of water is of corresponding ease or difficulty.

DETAIL OF LOGGIA.

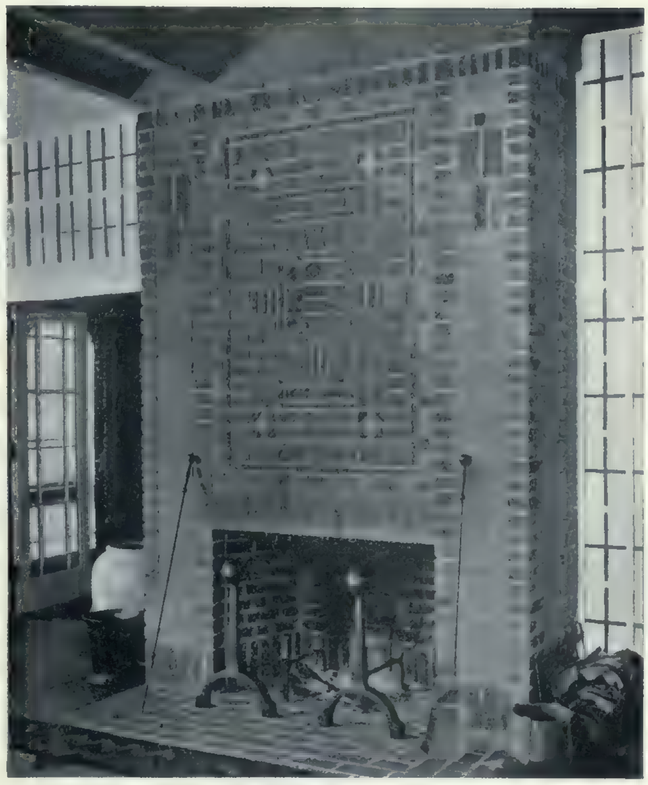
Now I can quite well believe that my arguments may convince you that the permeable brick will let more air pass than the merely porous one, but you will say that the same applies to water. This is true, but two points even in this connection still indicate that the permeable brick is best for buildings. The first is that, provided the wall is not too exposed to constant driving rains, in which case it should be built hollow, the water dries out very rapidly when the rain stops. In our variable climate, the permeable brick will usually dry out completely between the rain periods and before any water has penetrated the wall, and will again let air through. The porous brick will not, because it takes proportionately longer to dry than it does to wet. The second point is the effect of frost. It is well known that water expands just before freezing. That is why it cracks our water pipes. The same thing happens inside a brick, but when the water in a permeable brick freezes, the holes are large enough to let the ice squeeze out when formed and no harm is done. In a porous brick (that is one with extremely fine pores) the ice cannot squeeze out for the same reason as you cannot blow through a minute tube, and so it bursts the face off the brick instead.

I must speak here in passing, of two

kinds of brick in which the properties of porosity and permeability are of quite a different nature. These are the bricks made by the semi-dry process of manufacture, of which more later. In one type the shale is pressed into shape in a nearly dry state and plasticity is not present at any stage of the process. When burned in the kilns no change of physical condition of the clay takes place. Shale is in the form of flakes, and the interior of the brick, therefore, is in an irregular condition with no direct uniform pores or tubes in it. Yet it contains a proportion of spaces with air in them. The outside surface is more compressed than the inside, and is smoothed or polished by the action of the steel moulds in which they are pressed. When, therefore, after a long exposure to wet, the interior becomes more or less soaked or sodden with water, frost will produce the same disastrous results as with the "porous" non-permeable brick, but in a still greater degree. And once the skin is broken further disintegration is still more rapid.

The second type is generally made by the semi-dry process, but on burning in the kiln the clay begins to melt and becomes vitrified. It is then practically impervious to water and suffers no harm in frosty weather. It is a good sound brick, but it does not breathe at all, and therefore possesses only one of the two important virtues of the brick that is perfect from the hygienic point of view. The permeable brick has a further virtue as it does not conduct heat and cold as much as the hard impermeable brick, and for all these reasons I venture to express the opinion that a sandy hand-made brick, besides being more artistic, is more lasting and more hygienic than any other type made.

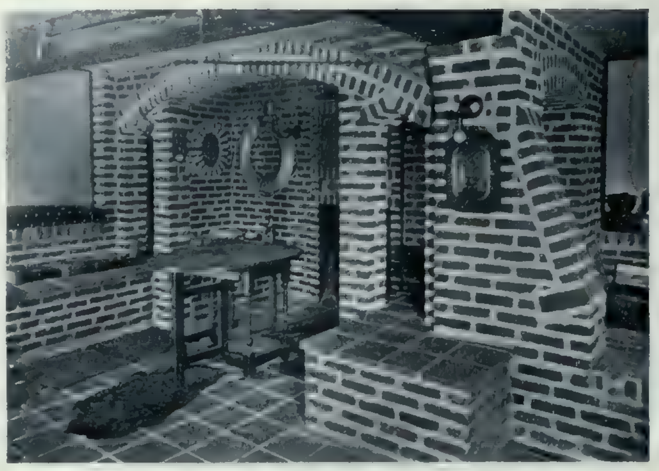
Continuing my remarks on the physical properties of clay, I would call your attention to the fact that in the practice of brick drying and burning many technical difficulties arise and


FIREPLACE.

HOUSE AT GREAT NECK, N.Y.

PERGOLA.

many interesting scientific principles are involved. In the use of the plastic method of making, a curious feature is seen in the difference of behaviour of surface clays and geological clays. The aim of manufacturers is to dry the newly made brick with the least possible injury to shape by twisting or cracking. It is found that a surface clay presents little difficulty in the early stages of drying, but it is very apt to crack suddenly when about two-thirds dry. On the other hand, many geological clays are very liable to crack in the early stages, and yet give no trouble when about one-third dried. A similar difference exists in burning the different classes of clays. The surface clays do not shrink in burning unless over burned, but many geological clays shrink little in drying, and a great deal in burning. Some of these when burned behave curiously, in that you may get them up to full temperature in the kiln, and for twelve hours or so they do not contract. Then they begin to do so, and for forty-eight hours continue to shrink in a regular manner. Practice teaches the burners to measure this contraction, and when it reaches a certain amount they stop firing, because they know the goods will prove correctly fired. With the surface clays this does not occur, but the color of the goods is influenced by the length of time the full heat is kept up.


WINE CELLAR.

SUTTON PLACE, ENGLAND.

The burning of bricks presents many other interesting features, chiefly in relation to the production of the final color required, but I must begin at the beginning of this branch of the subject. Clay contains a great deal of water, and speaking chemically, this water is present in three distinct conditions or states. A wirecut or handmade wet brick contains "water of manufacture," which is evaporated completely in the drying process. The brick is then no longer plastic, but is hard and solid. If now it is heated up to the boiling point of water, 212° F., it loses more water called hygroscopic water. The water of manufacture may be from 33 to 50 per cent. of the total weight of the wet brick. The hygroscopic water is about 5 per cent. The driving off of the hygroscopic water in the kiln is called steaming. If the brick which has been steamed is taken out of the kiln it will absorb water from the air until all the 5 per cent. is back again in the brick, but it will not absorb any water of manufacture.

Up to this stage the clay can be made plastic again by wetting it. On continuing to heat up the kiln till it reaches about 900° F., more water again is driven off. This is the water chemically combined with the silicate of alumina. It amounts to about 10 per cent. of the weight of the dry brick, and when once it is driven off the plasticity of the clay is finally lost and cannot be restored. The clay has become brick, although at that temperature it is not sufficiently changed in chemical nature to remain permanent and solid. The heat must be raised to about 1,800° F., to produce a well burned red brick, and still further for other types such as firebrick, which

FIREPLACE.

requires about 2,250° F. temperature. Having considered the action of heat in burning clay we are still confronted with a number of other features of the process of burning.

Burning Processes. — There are roughly speaking, five distinct processes, each with special variations according to the qualities of the goods, and with a number of different types of kilns for use. The first and oldest process is clamp burning. The process is characterized by the mixing of the fuel with the clay before moulding the bricks. The fuel is usually sifted house dust, that is the contents of house dustbins freed from their old tins, cabbage leaves and other refuse till only the cinders are left. This fuel contains about 35 per cent. of coke proper. The huge stacks of bricks containing this fuel intimately mixed with the clay have two or three layers of large cinders at the bottom, which are fired and serve to ignite the mass. The bricks are stacked closely and air gets access to them so gradually that the heat is generated slowly and more or less regularly throughout. A clamp may take from six weeks to three months to burn through and requires a great deal of expert attention to get good resudts. The air supply is so restricted that no more reaches the bricks than suffices to burn the fuel. None, therefore, is left over for the oxidation of the iron in the clay so that a yellow color instead of red results.

The burning of common bricks, red bricks, tiles and firebricks is carried on in kilns of a great variety of types, either fired with coal or gas. This I call the second process. A brick structure is built to contain the goods and fire grates are constructed below or by the side of them on which coal is burned. The stages of the process of kiln burning are as follows:—Steaming, raising the heat, soaking and cooling. The first two are the same in all the types of kiln and all processes of burning. The soaking, however, is effected in two different ways. With red and most common bricks the soaking is done with a free burning fire and ample draught, so that a large volume of heated air plays on the bricks and oxidizes them thoroughly. With certain blue bricks the soaking process takes another form called smoking. An excess of coal is put on the fire and the air supply is reduced so that smoke fills the kiln.

In this, the third process of burning, we see a reproduction of what occurs in clamps. The air supply is insufficient to burn up the smoke in the kiln and the bricks are finished in an atmosphere that does not oxidize the goods but on the other hand, "reduces" the iron in them and produces a blue instead of a red color.

The fourth process is salting. This may be used for three different effects—fuming the brick and producing a silvery grey color, reducing the brick and so in another way getting the blue color, or salt-glazing the bricks or sanitary pipes. Salting is a simple operation and is done during the last few hours of full firing by

DETAIL OF PALACE OF FONTAINEBLEAU, FRANCE.

FIRE STATION.

throwing common salt into the fires. It becomes volatilized and the fumes pass over the goods in the kiln and form chemical compounds with the silica and alumina, which, in sufficient heat, fuse and form a more or less pronounced glaze.

The fifth burning process is that employed for high-class goods of various kinds, chiefly pottery and expensive tiles. They are placed in closed receptacles, either muffles or saggers, so that the flames and gases of the fuel do not come in contact with them. This process is the only one that can be called baking in the ordinary sense of the word, the muffle or sagger being a true oven with a fire playing round it. It is not used in brickmaking.

One of the remarkable features of brick burning is that though much heat is expended on the process very little is actually used. It is nearly all thrown away. Raising the temperature of the bricks and driving off the hygroscopic and chemically combined water, uses heat in well-known quantities, but the process of turning clay into brick by heat uses none. This is a physical fact hard to understand, because as I have hinted earlier in my lecture, the coal consumed in the process is considerable in quantity. For red bricks it is from 15 to 20 per cent. of the weight of the burned goods in intermittent kilns. The way in which the heat produced by the coal is used is mainly in keeping the bricks at a high temperature till the necessary chemical action has taken place.

The principle of the continuous kiln is the using over again as much as practically possible of the heat wasted. Even in these the loss of heat by warm gases going up the chimney and more notably still the loss by conduction through the massive walls of the kiln is enormous and cannot economically be prevented.

Types of Clay.—The clays that interest the brickmaker chiefly are the shales, marls and surface clays.

Shale.—Shales are almost always made into bricks by the semi-dry process, although the plastic process may be used. In Peterborough, where bricks are made from an oily shale, even the excavation of the shale is done with steam diggers on the largest works. The shale is brought straight from the bank to the machine, there to be ground to a granular condition. It is screened mechanically to the required fineness, mixed mechanically with a small amount of water if necessary, and then passed automatically into presses with rectangular cast-iron moulds for fashioning the brick. The pressing into brick form may be completed in one operation or the brick may be pressed a second time to improve its finish. Water in small proportion is necessary in order to obtain the cohesion of the fine particles or grains of shale. From the presses the bricks are taken straight to the kiln in which they are dried and burned in one continuous operation.

It is often stated that they are made dry and do not require drying. This is not true, but the amount of water in them is much less than in those made by plastic process, and they are sufficiently hard and strong to stack in position for burning direct from the presses. In the kiln they are dried first and burned afterwards continuously. In contrast to this, bricks made on the plastic system are too soft to be stacked in the kiln and must be dried first by one of the various means employed in the trade.

TAP ROOM IN HOTEL.

Marls.—They are so called because of the presence of carbonate of lime in varying quantity. Carbonate of lime or chalk has this peculiarity in connection with brickmaking, that when present in lumps or nodules it is exceedingly dangerous and destructive, unless effectively ground up or eliminated, but when in a fine state of division it is harmless. Marls rarely contain more than 5 per cent., but they require very careful selection and treatment, even when the proportion is much less. The carbonate of lime when not finely divided becomes converted in burning into quick lime, which slacks when the bricks absorb moisture from the air with the result that the face becomes pitted through the lime blowing pieces off the face. Yet clay exists containing as much as 40 per cent. of carbonate of lime that may be made into sound bricks.

CHURCH AT CAMDEN, N.J.

Marls are plastic clays and in common with gault and surface clays, when made into common bricks are treated by the wirecut system of brickmaking. The clay is dug and conveyed in wagons usually by a suitable hoist direct to the machinery. This may consist of a brickmaking machine only, or preferably a train of machinery which gives a thorough preparation to the clay before it is finally pugged. This machinery may consist of all or either of three types. The grinding pan resembling a mortar mill is useful in working up a sandy non-cohesive clay to a more plastic condition than it possesses in its natural condition. The bottom of the pan is perforated in parts and the rollers squeeze the clay through the perforations causing it to drop into the next machine.

Again, the clay may instead be passed through one or more pairs of rollers running at different speeds. These crush the clay, and any stones or lime contained in it, and at the same time tear it slightly by reason of their different speeds of running. From the pan or the rollers the clay may pass to a third type of machine, the mixer. This may be open or closed and have one or two revolving shafts. On the shafts are knives so inclined as to push the clay forward and mix it at the same time. The mixer may be about 6 feet long and horizontal in position. From the orifice at the end the clay drops into the hopper of the brickmaking machine. If required, water is added to the clay either in the pan or the mixer, but never in the rollers, as it would cause the clay to slip.

The brickmaking machine usually has a small pair of rollers mounted on it through which the clay is forced into the barrel. This again is horizontal and is furnished with a single shaft, and pugging knives similar to those in the mixer. These knead and compress the clay and press it towards the mouth of the machine. At the end of the shaft a worm is placed which pushes the clay through the mouthpiece and die, and forms it into a continuous rectangular column of the correct cross section. The dimensions of the cross section correspond with the length and width of the brick allowance being made for the shrinkage in drying and burning about which I have already told you. The column of clay is now finally cut off by wires drawn transversely through it, the wires being spaced the necessary distance apart to give the correct thickness of brick. From the cutting table the bricks are wheeled to the drying ground, shed or other apparatus in order to be thoroughly dried before being stacked in the kiln for burning.

Hand Brickmaking.—I now have, therefore, to give you finally some description of the older process of hand brickmaking, which holds its own in certain parts of this country, England, in spite of the great improvement of machines in the last thirty years. It is the process used in the days of the Babylonians, Egyptians and

INTERIOR OF CHURCH AUDITORIUM.

Romans, and was that used by the first brickmakers in England up to the middle of the 19th century. It is to all intents and purposes the process used for all artistic terra cotta making in which mechanical aids are almost useless. Yet, strange to say, it is looked down upon with scorn by the countries far advanced in mechanical appliances, Germany and America, while it is practised almost exclusively in Belgium and Holland, and largely in France. The hand brickmaking process is used for making stock bricks and red facings. The clay is usually prepared for making by weathering, that is, by being spread out in layers in the open air, so that air, rain and frost may in turn act upon it and loosen it after its long confinement in the natural bed. Weathering is practised, as well as what is termed resting, on other clays, and although the effects of it are apparent and the causes guessed at, no definite knowledge has been obtained as to the reason it is so efficacious. Stoney clays for hand-making are also washed, but those found free of stones do not usually need it. The weathered clay is pugged or ground, usually in vertical pugmills driven by horse or steam power. These mills are essentially the same as the horizontal ones previously described and serve to mix the clay and incorporate the water and finally expel the mass in a condition fit for moulding.

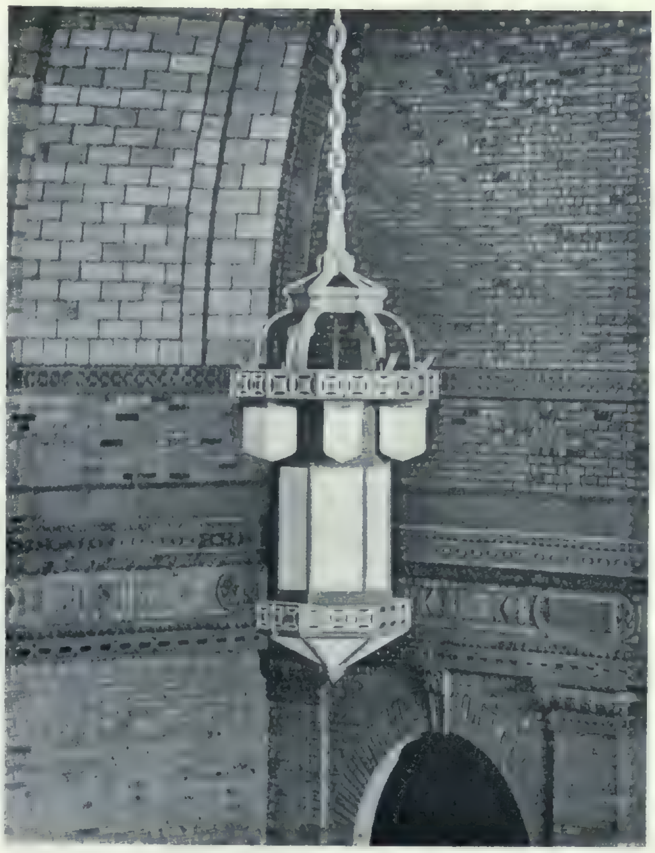
Steel or wood moulds of the required size are wetted and rolled in fine dry sand and placed in position on the moulder's table. A "walk" of clay, as it is called, is then made by the moulder and rolled into a shape suitable for throwing into the mould. This walk is dexterously rolled in dry sand and, when ready, thrown with some force into the mould. The excess of clay is then struck off and the finished brick dropped carefully from the mould on to a pallet. The final result and effect depends on a variety of circumstances. The surfaces of the brick may be fine and uniform, or they may be wrinkled and coarse. The brick may be true and square or out of shape and deformed. These defects are due to the idiosyncracies of the moulder, who requires training carefully in the way he is wanted to go. The final color and appearance depend on the quality of the clay and sand used, the kind of kiln, the method of firing, and the final temperature and soaking; all matters requiring constant care and much technical knowledge. The drying is an operation also requiring unremitting attention, and all the various materials, operations and skill combine to yield the final product, which may or may not produce adequate returns according to the demand and the success of the master in supplying it.

HILL MEMORIAL AUDITORIUM, ANN ARBOR, MICH.

The processes used in hand brickmaking are such as to afford to the clay the most perfect treatment from a physical point of view. The weathering, the slow pugging, the lengthy and complete drying, all tend to assist the clay molecules to adapt themselves to the altered conditions they encounter in their drastic change of state. At the same time, the ultimate result is not only sound physically, but it is in the highest degree artistic and durable, provided the processes of manufacture are all properly carried out. It is durable under all circumstances of environment; water, frost, sun, and fire all alike, leaving it unharmed and unchanged. That this is so, the old examples of brickwork in East Anglia and elsewhere eloquently testify.

History.—We all know that brickmaking as an art is ancient and even prehistoric. The earliest bricks found in Egypt are said to be 12,000 years old, and we are often reminded that the Children of Israel had to make bricks for Pharoah and find their own straw. These bricks were made of Nile mud mixed with chopped straw and the clay was trodden by men, much as it was up to quite recent times in this country. The bricks were moulded and sun-dried, but not baked and would have been of little use in our climate. They were hard and served to build lasting monuments in that arid country. The well-known Step pyramid of Sakkara is built of such bricks and was cased externally with marble slabs, now removed. It is the oldest pyramid in Egypt.

It is said that the Tower of Babel was built of brick, the record being that the builders said, "Go to, let us make bricks and burn them thoroughly." The walls of Babylon were built of bricks, and from the ruins the bricks have been carted away in modern days to build new cities. The burned ones were 13 inches square and 3 inches thick and the unburned ones of various sizes and they were set in bitumen. The great wall of China was built of burned and unburned bricks 2,000 years ago. It was 1,250 miles long and about 22 feet high. The walls of Athens on the side of Mount Hymettus were of brick, but the Greeks did not use them so much as the Romans, who were probably the first to burn them in kilns and improve their quality. In the first century A.D., they were of better quality than at any subsequent time, being then made about 2 feet square and 1 inch thick. Later they were made smaller and thicker, but by the end of the 4th century the art was practically lost until about the 13th century.



DETAIL OF RAILWAY STATION.

In England, as you well know, the Romans introduced bricks and brickwork in the 5th century, an example still remaining in Holy Trinity, Colchester. Colchester Castle, built in 1078, is largely of Roman bricks and also St. Botolph's Priory, built in 1116. The British people did not find the need of building in brick until the late 13th and early 14th century, because of the immense forests and abundance of wood, but they used clay as a filling between wooden external walls and board linings. Little Wenham Hall, built in 1260, is the earliest British build-

DETAIL OF RAILWAY STATION.

FARM BUILDINGS AT BERNARDSVILLE, N.J.

ing, the bricks being 9¾ by 2¾ by 2¼ inches, and mixed with courses of stone and flint. These and many of the bricks used in the Tudor period were probably imported from Holland. In late Tudor times terra cotta began to make its appearance, such as is found in Wolterton Manor House, East Barsham, built in the time of Henry VII. From Tudor times through the Renaissance period bricks continued to be used, and after the fire of London in 1666, brick was generally used in the rebuilding of the city.

A great revival, however, occurred when mechanical manufacture became prevalent, and since that time one of the greatest booms in the use of bricks was witnessed in the revival of the Queen Anne style of architecture in the seventies and eighties. This was followed by the mushroom growth of the Fletton brick industry in the nineties, and a marvellous activity in the building trade about 1900, when bricks were in such demand that they fetched famine prices. The Transvaal War put an end to this activity, and for the last ten years such dullness has characterized the trade that I do not think more than one-third the number of bricks have been made annually.

You do not require to be told of the present vogue for the use of bricks of the Tudor type for facing buildings of all kinds. The genius of many of our greatest architects has found expression during the last few years in this ancient material in work that is characterized by greater variety and charm than is to be found in any previous style.

HOUSE AT LEATHERHEAD, SURREY, ENG.

IN commenting on the laying out of streets, G. B. Ford, city planning expert of New York city, expresses the opinion that the width of roadways, even in the newest and most progressive plans, is wasteful to a mad degree. He claims that in the residential districts of a city wide roadways are not often really advantageous. They mean much dust in summer and much opportunity for sweeping winds in winter, and at all times of year they mean danger zones for little children—the death rate from vehicular accidents on the wide avenues of the suburbs is much higher, in proportion to the density of surrounding population, than that on the narrow streets of more congested downtown districts. This error is not exclusively New York's. Most American cities demand a width of sixty feet for roadways. In residential districts, such as many in Brooklyn and Queens, there is not now and never will be any need for such a roadway width. Narrower streets would be much more desirable. Much of the cost of suburban property goes into street improvements, giving purchasers less actual value in their private holdings than they should get for their money. Imagine the money New York has invested in practically unused pavements on wide suburban streets! Study the tracks made by vehicles on the wide paved streets which you know, and see if often the tracks are not concentrated in the middle of the street, leaving the sides an unused waste.

Many regions which should be devoted principally or wholly to the detached or semi-detached homes of workingmen, are barred to such homes by the cost of street improvements and the waste of property devoted to street uses. This makes it necessary for the owners to get a high rental for what land is left to them, and in order to secure this rental they must build tenements instead of detached houses. The bad influence of such work in the past will be felt for many generations.

Too wide streets enormously increase the cost of the abutting land; they increase the dust nuisance in summer, thereby spreading disease and increasing the work of housewives; they injuriously magnify the sun's glare; in the winter they vastly multiply the aggregate cost of house heating, for, being wide, they are windswept and colder than narrower thoroughfares would be. Wide streets, too, tend to attract through traffic into residential districts, where there should be only such vehicular activity as is demanded by the necessities and the pleasures of the residents, such as the delivery waggons which supply their needs, and their own carriages and motors.

The average suburban roadway, therefore, needs to be only wide enough for three vehicles abreast, or, at the outside, twenty-four feet in width, and often a width of eighteen to twenty-one feet is quite satisfactory.

In a number of European cities the problem of locating manufactories and warehouses has been solved through the acquisition by the municipalities at low prices of large tracts of land conveniently located for transportation, along waterfronts or railway lines, where the development of first class docking or freight handling facilities is an easy matter. This land is then sold or leased to enterprises needing such facilities. Frankfurt, Germany, offers a particularly good example of this sort of modern scientific city planning and one which Canadian cities might very well consider as they plan their future growth. There a large tract of swampy territory was acquired by the municipality at a very low price and developed with very modern docks, railways, classification yards, etc., to its own vast advantage and the protection of the balance of the community. Already enough land has been sold to manufacturers to more than pay the original cost of the entire property and improvement.

* * *

THE keen interest manifested by the Kansas City *Star* in concrete leads us to quote the following editorial, taken from a recent issue of this versatile paper: "Concrete was used by the Romans, who also invented the celebrated Roman nose, which is still used with great success. Concrete is composed of cement and broken stone, which are mixed with water by a tired man in overalls and a red flannel shirt and converted into a sort of geological Irish stew. The mess is then stuffed into a wooden mold, and when it dries it is so hard that when Time attempts to nibble it with his justly famous tooth it has to go to the dentist's with a low shriek of agony.

"The Romans wasted their concrete building bridges, coliseums and roads. Had they built their emperors of this material they would have been more durable and the empire would have lasted longer. A reinforced concrete emperor would have been less fatal to the populace, while the sight of a prætorian guard pecking away at the impenetrable crushed stone thorax of his ruler with a valuable sword in an effort to create a vacancy on the throne would have been highly diverting.

"Nowadays concrete is used with great success in building houses, sky-scrapers, bridges, baseball parks, pavements, sidewalks, wormless tombs, boats, artificial legs, telegraph poles, water tanks, artificial pipes, false teeth, cathedrals, smokestacks and eating-house sandwiches. Concrete has, in fact, become the most useful thing in the world, and many a mountain which has only been an obstruction to traffic will be ground up in the next few years and sold in sacks to men who have cities to build.

"Thomas Edison has recently invented a method by which concrete houses can be poured to order by two strong men while the family is unpacking the furniture. This will be a great boon, and before long we may expect to buy our houses at the store by the gallon and to draw a cute little Queen Anne garage out of a faucet and take it home in a pail.

"Concrete, reinforced with steel, is the strongest material yet invented, but science thus far is only building bridges and sky-scrapers with it, and has not yet used it in providing practical backbones for public men. When this has been accomplished the grade of statesmen available will be vastly improved and the old style office-holder with the gutta percha spinal column will wabble into oblivion along with the wooden hotel."

* * *

THE Ceresit Waterproofing Co. have arranged with the McLellan Peters Company, 305 Read Building, Montreal, to handle their interests in that city as well as Ottawa, Quebec and intermediate territory.

* * *

THE Standard Sanitary Manufacturing Co. has issued a handbook on plumbing fixtures, especially compiled and illustrated for the benefit of home builders and those desiring to improve the sanitation of their present dwellings. It is the ninth edition of "Modern Bath Rooms," and contains many features not included in former editions. Three other booklets treating of sinks, lavatories and closets furnish valuable information in respect to the various subjects handled.

* * *

THE Herbert Morris Crane and Hoist Company, Limited, has issued a bulletin, B5, devoted to the various types of travelling trolleys made by the company. These trolleys are of many patterns, to run either on a flat-bar track or on the lower flange of an ordinary steel I beam. Some of them are prepared for short, straight runways, while others, containing suitable swivels, are flexible in a horizontal direction, and thus permit of the use of curves or "bends" in the track.

* * *

THE issue of *Canada,* April 25th, contained the first of a series of portraits in color of men prominent in Canadian affairs. These plates are reproduced from portraits specially painted from life for *Canada,* and are included as supplements in the ordinary issues of the paper. The series will enable the public to become familiar with the personality of the men who stand for Canada in the eyes of the world, each portrait being accompanied by a letterpress study of its subject and the phase of Canadian life and work he represents.

AN order has just been received by the Herbert Morris Crane and Hoist Company, Limited, through their agents in Vancouver, Messrs. Waddy & Young, for a 10-ton hand operated overhead traveling crane fitted with Morris roller bearings to the main traveling motion. This order was placed by the City Engineer of Prince Rupert after considering quotations from all the leading American makers of cranes. The new power house is well under way and is expected to be in full operation before the Fall.

CHARLES G. TOMS, B.A.S.C., a well-known Toronto engineer who has recently organized the Toms Contracting Company, Limited, of which Mr. Toms is general manager.

"CERTAINTY"

is what is sought for by everyone. With the Architect and Engineer this is particularly true

The Dietzgen Instruments and Materials are manufactured in our own Factories under the discipline of establishing Accuracy and Dependability; always with the idea of the exacting purpose for which they are intended, and not simply as merchandise to sell—to co-operate and verify with exactness the thought behind their use.

EUGENE DIETZGEN CO., LTD.,
116 Adelaide St. W., Toronto.

CONSTRUCTION

July, 1914 Vol. 7, No. 7

CONTENTS

EDITORIAL 253
The artistic development of the small house.

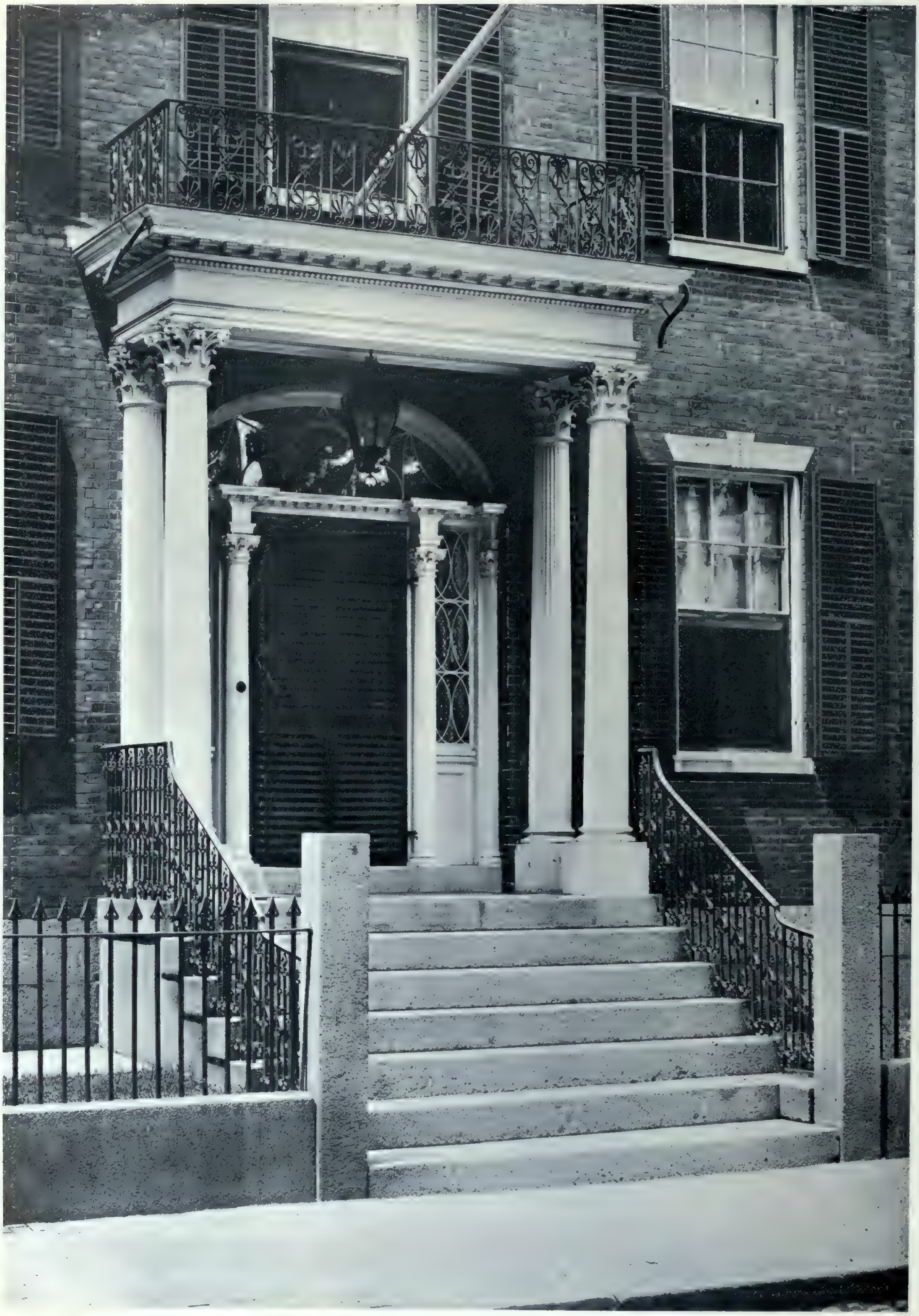
HOUSES UNDER $15,000 IN WINNIPEG 255
HOUSES IN TORONTO 275
COTTAGE DESIGNS, COMPETITION 287
BRICK HOUSE, COMPETITION 305
TRADE NOTES 308

Full Page Illustrations

ENTRANCE TO FORRESTER-PEABODY HOUSE, SALEM, MASS....Frontispiece
HOUSES AT WINNIPEG 254-266
HOUSE IN MONTREAL—STAIRCASE HALL 269
HOUSES AT TORONTO 276-286
HOUSES AT MOUNTAIN STATION, N.J. 303

H. GAGNIER, Limited, Publishers
GRAPHIC ARTS BLDG., TORONTO, CANADA

BRANCH OFFICES
MONTREAL WINNIPEG CHICAGO NEW YORK



COLONIAL ENTRANCE TO THE
FORRESTER-PEABODY HOUSE,
AT SALEM, MASSACHUSETTS.

EDITORIAL

The home as an expression of the personality of the owner depicted through the keen insight into human nature by the architect.

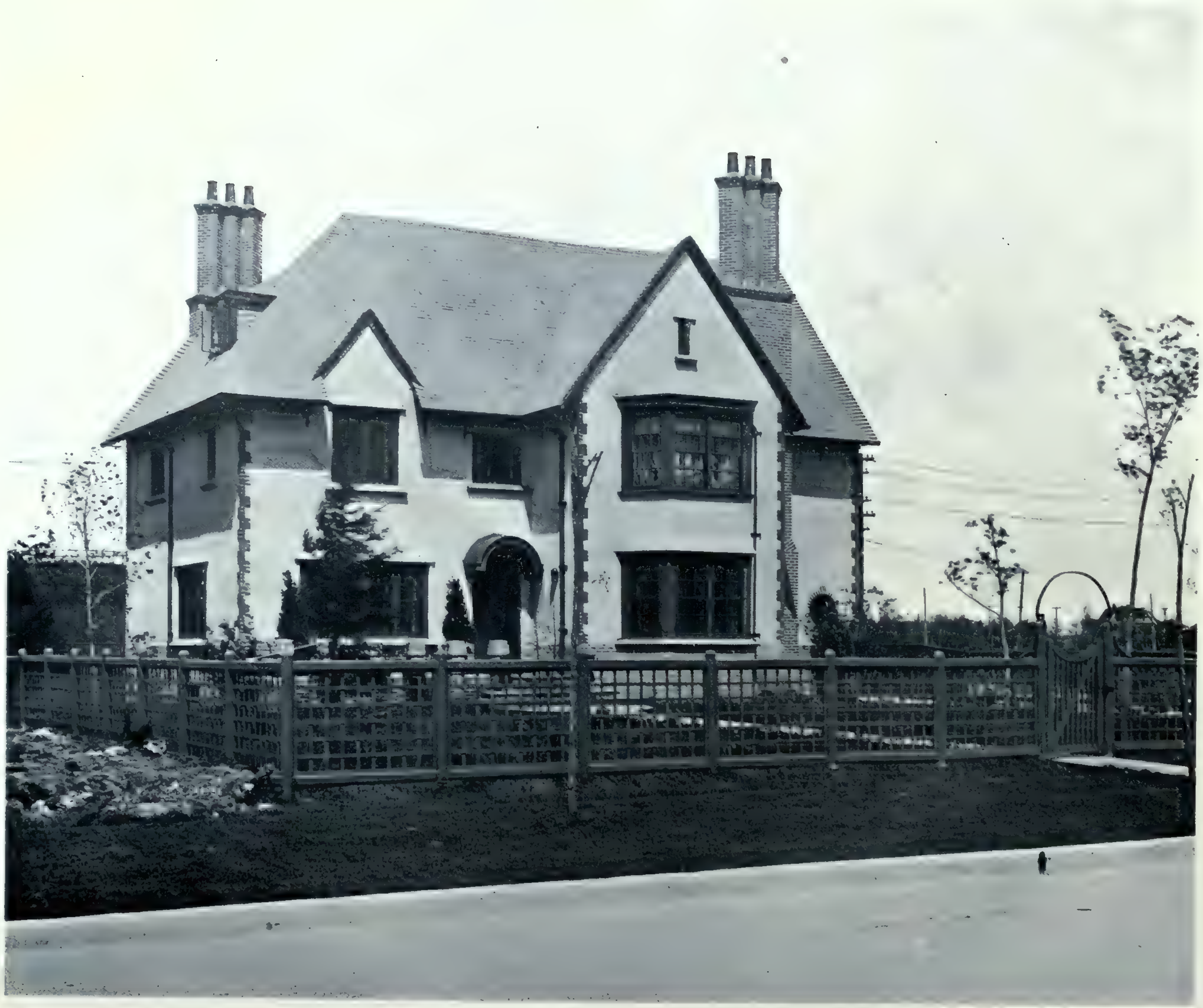
THE BUILDING of a home has become a living art; one in which the highest ideals are brought into practical use. Honesty seems to be the keynote both in the frank and straightforward expression of the materials employed as well as in the endeavor to meet the real needs. Here as nowhere else can the personality of the individual be felt. The endeavor is not to suit friends and relatives, but rather have a home expressive of our own true selves. Modern independence is felt and we build from an inherent taste for decorative features, harmonious furnishings and natural surroundings. The home should prove a true setting for the dweller and no place is successfully designed unless it portrays to a certain extent the character of the owner.

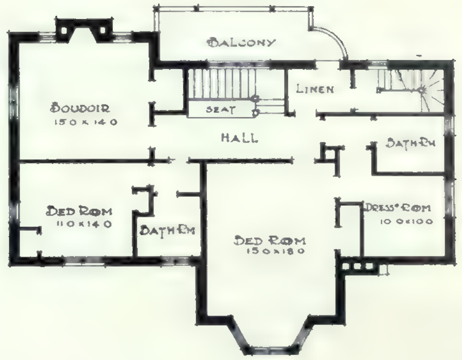
The architect must be broad enough to read his client, feel his simpler nature and understand his moods. To disregard these is a irretrievable wrong, for so much of one's future is dependent on the harmonious relations of the home. Every detail is carefully considered in relation to each other and also to the *tout ensemble.* No longer can the house of many styles be the acme of true art, but rather the style of the owner himself, and it is quite fitting that the architect make it expressive of the person who decides to live therein. The plan of each home is a special problem and merits the best work of the architect in charge. Just as the desire for truth develops in our domestic building, so will the general appearance of our residential districts improve. For to depict the personality of a great man is to create a work of profound interest which cannot fail to impress. And little fear may arise as to the final results for individuality is seldom eccentric.

Aside from the æsthetic taste, the planning of a house is essentially a practical problem. The site, the client's needs, the cost, are all matters of consideration. The site fortunately adapts itself to so many styles that it conforms to buildings of varying costs. The cheapest materials, and beyond doubt the best both artistically and practically, are the local ones, which lend themselves to the most perfect harmony with their surroundings. With a symmetry without and a livable charm and convenience within, the architect has given a free and frank expression of his own ability to depict the client's inmost wishes. Which can only be done when there is a sympathetic relationship between the architect and the owner. And such a perfect understanding has already resulted in the appearance of a large majority of our charming residences and augurs well for the future trend in residential work.

It will not be possible to list our modern home under a class or certain style, but rather the product of a personal element. In doing this we must allow our own individual selves to speak. We cannot, nor would we, ignore the past. The influence of historic styles will always be felt, but to bring about a domestic style suitable to our life and conditions we must borrow motives instead of copying exact forms from other ages.

The house, like all other types of buildings, has been a continuous growth, deriving its changes from the various styles of the past. Probably the greatest force was felt in the Italian Renaissance although the pure classic furnished many ideas. The spread of the Gothic was also a potent factor in its development as well as the many other periods resulting therefrom. The real estate man and speculative builder has helped to fill our cities with unsightly dwellings, but we are gradually rising to a higher plane and will soon feel the wave of reform brought about by a keener insight into the needs of the people both from the artistic standpoint of the architect as well as a desire on their part to enjoy the charm and comfort of a real home.

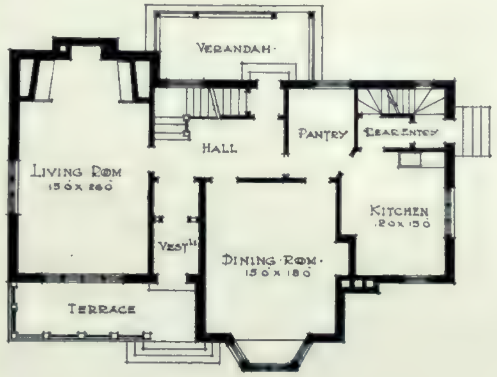




PLAN · OF · CHAMBER · FLOOR

HOUSE NO. I,
WINNIPEG, MANITOBA.

WOODMAN & CAREY,
ARCHITECTS.



PLAN · OF · GROUND · FLOOR ·

Houses Under $15,000 in Winnipeg, Man.

FRANK N. RUTTAN

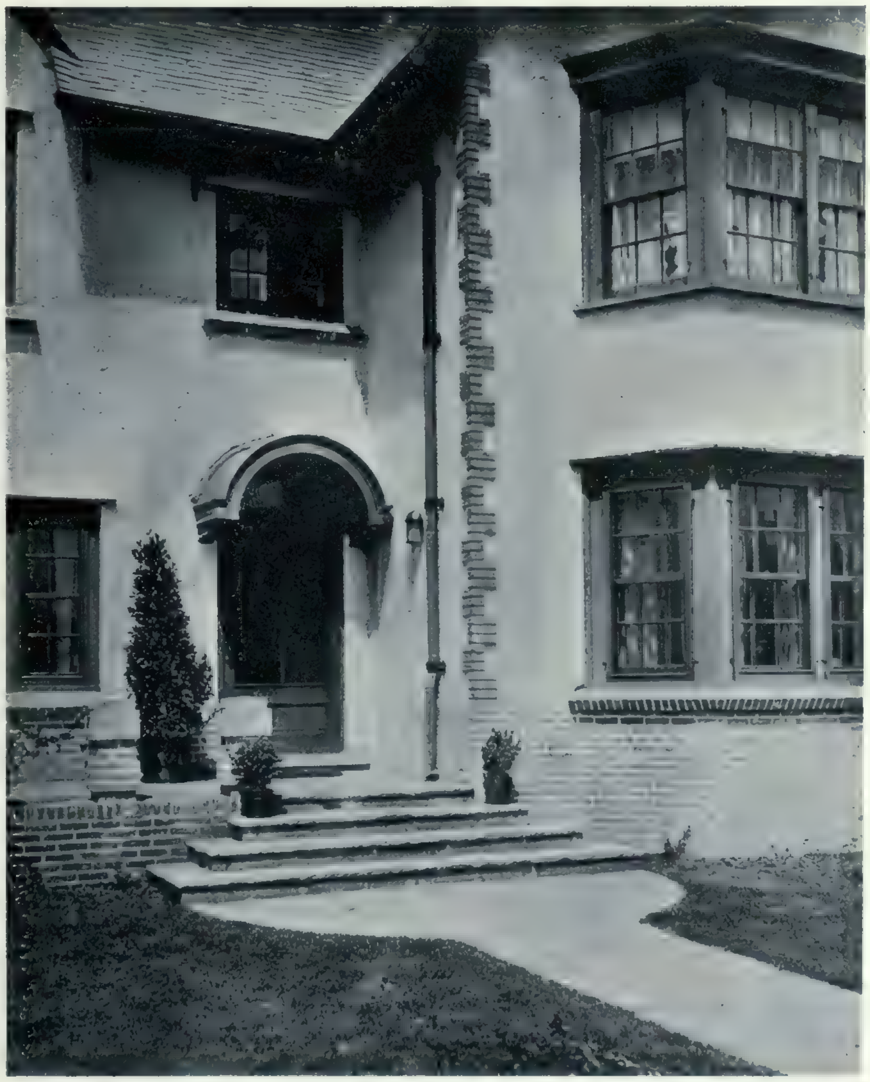
THE remarkably rapid growth of Winnipeg, only a few years ago a small prairie town, has made it necessary to provide accommodation for a great number of people in a comparatively brief space of time. The city has consequently proven a lucrative field for the speculative builder, who has taken advantage of the rapidly rising price of land as well as the great demand for houses, to prosecute his calling with at least commendable energy and a good deal of foresight as he quickly becomes appreciative of those factors which render a house saleable. One of the first things to be determined by the prospective purchaser is whether the house will prove warm and comfortable, and it is probably owing to this fact that usually these speculative houses are fairly well built and so find a ready sale.

Appearance, of course, is a secondary consideration, and as the houses generally sell on fairly attractive terms the employment of an architect for small house work is not of as frequent occurrence as might be. However, the public is gradually being educated to the benefits which may be derived and the value acquired in the building of their own homes, no matter how small they may be, with the "assistance" of an architect even if he be employed merely for the purpose of "putting in the windows and the doors!"

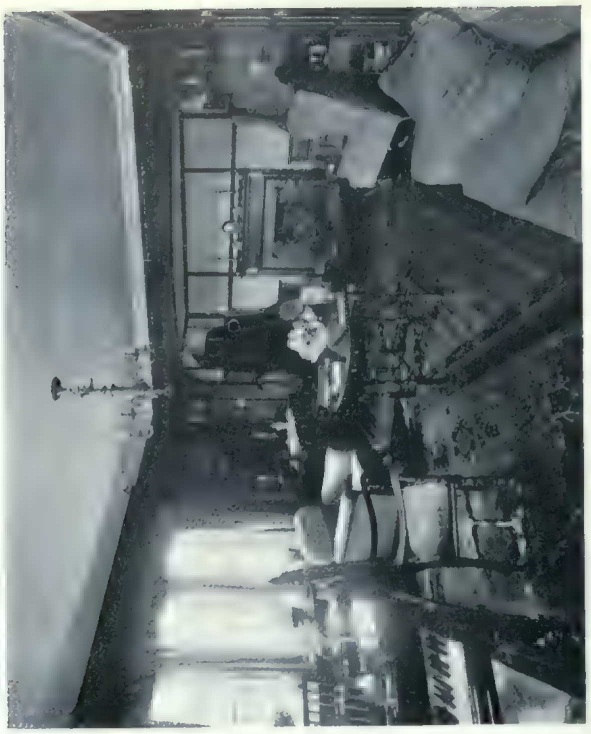
The high price of land makes the site for the small house almost invariably a narrow lot usually devoid of trees or other natural advantages. The problem of the design of the small house thus becomes one in which the conditions are almost identical, so that unusual features in plan are not often found; climate as well as site favoring a square, compact plan. Again, the cost of building as compared with other cities where the extremes of temperature are not so great, is a factor which leads to simplicity both in plan and elevation. Little is left for the employment of expensive material or the gratification of the architect's delight in well executed detail.

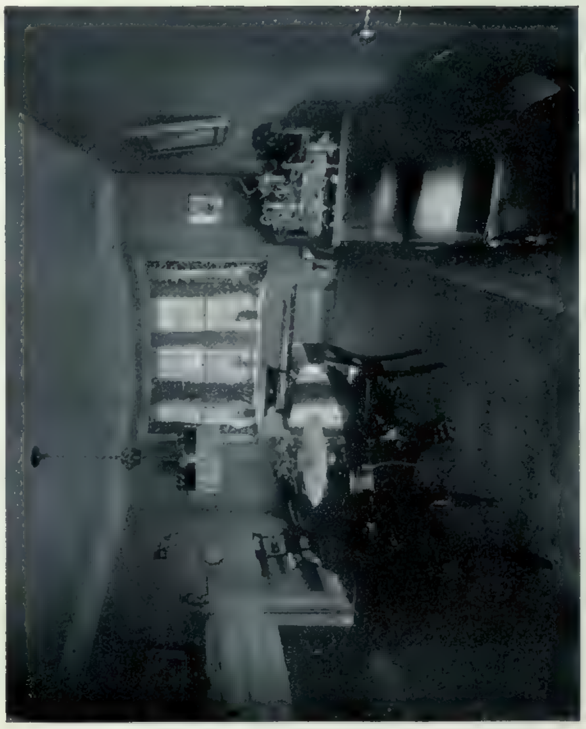
A brief description is given herewith of the various houses illustrated, which are representative of the better class of work done in Winnipeg.

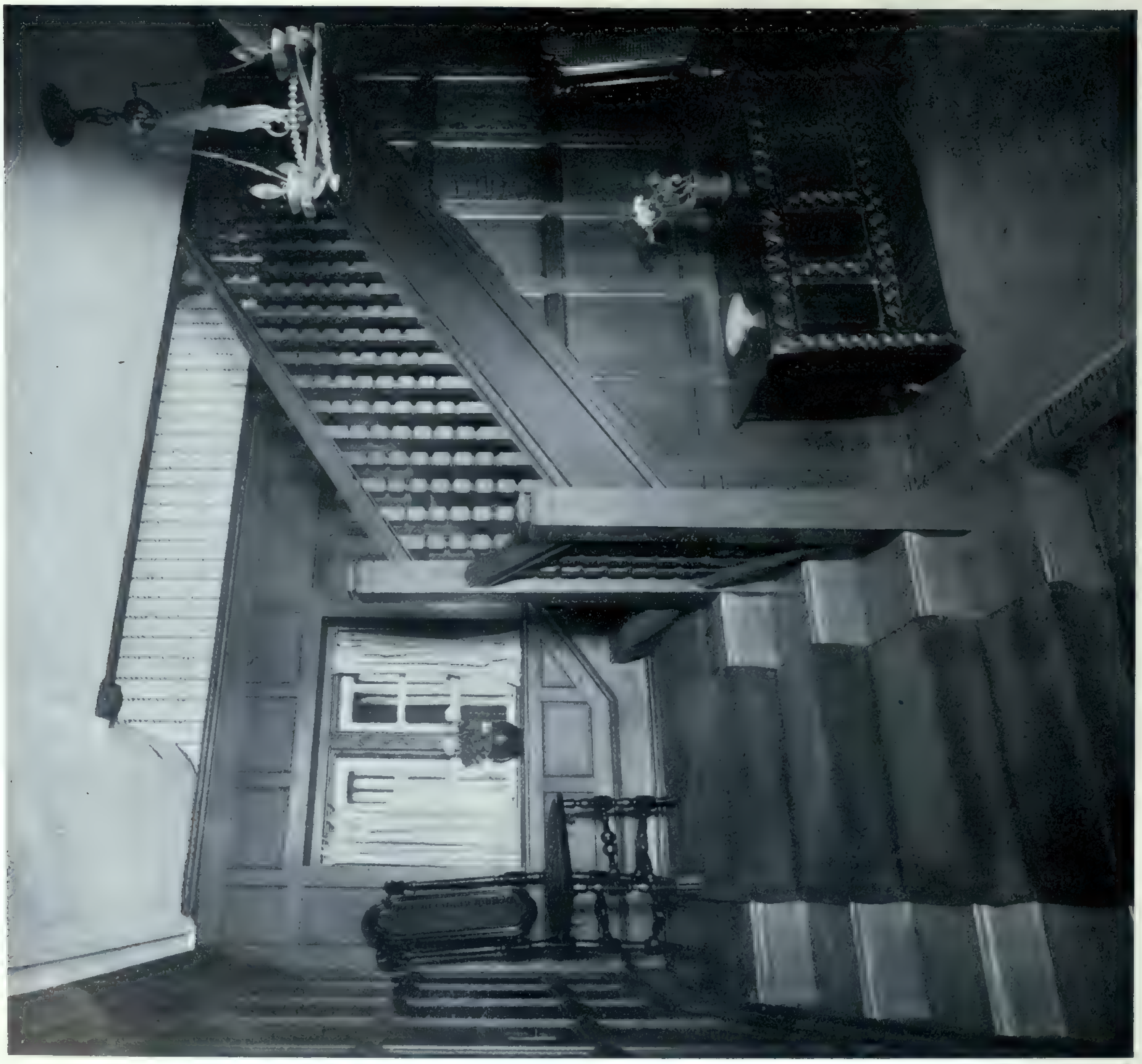
House No. I, Dromore Avenue; Woodman & Carey, Architects.—This house follows closely the model of the small English country home. It is a logical and consistent adaptation of that type, none of its features being at variance with the conditions peculiar to this country, conditions which do not lend themselves easily to the reproduction of a type which has for its outstanding characteristics low, broad effects and a picturesque grouping of parts. The plan is simple and well arranged, both for its purpose and for the development of the elevations, which are excellent in scale and proportion. Although the ground floor level is well above the grade, yet the usual unpleasant effect which this produces is somewhat overcome by the stone-



DETAIL OF MAIN ENTRANCE, HOUSE NO. I.



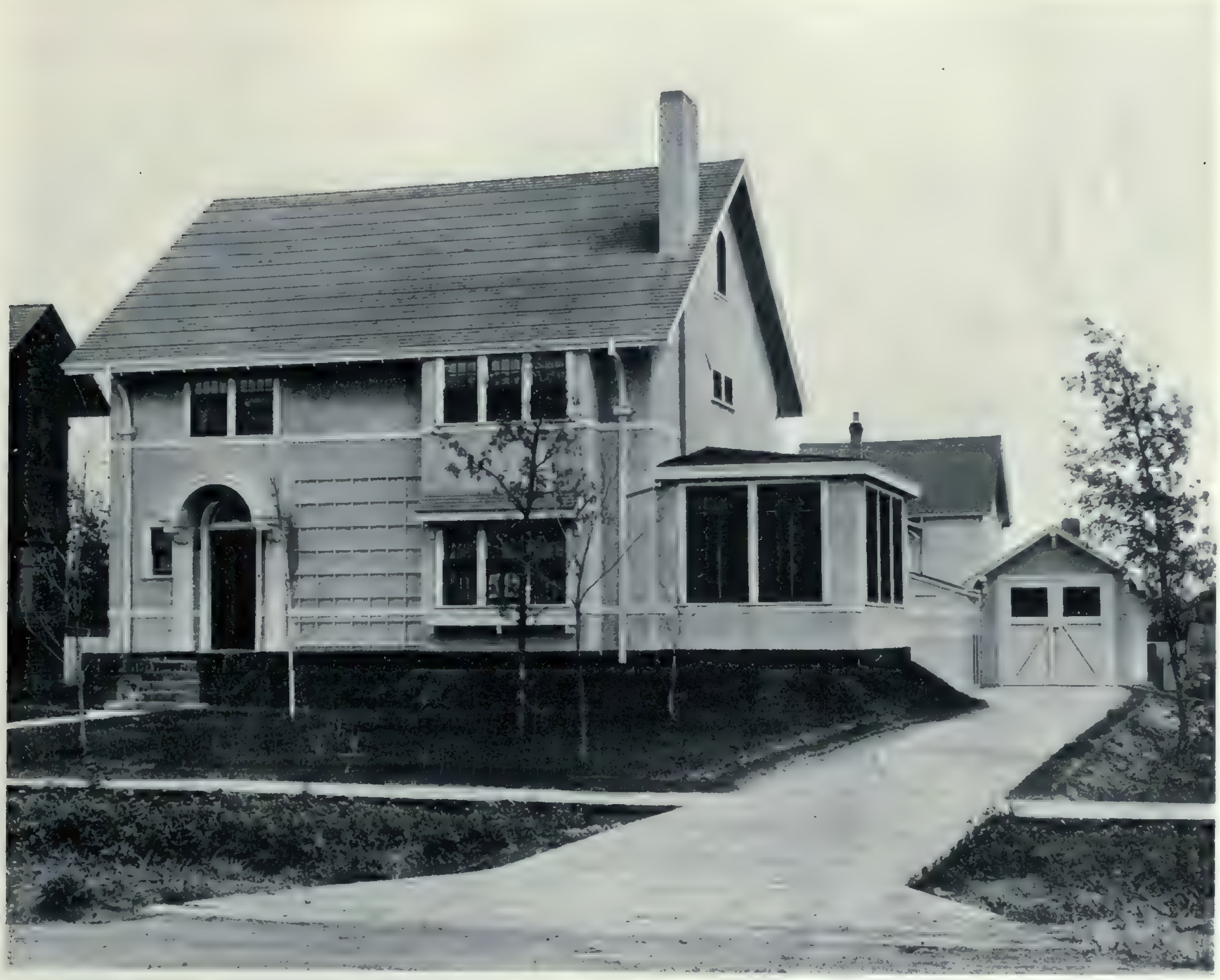


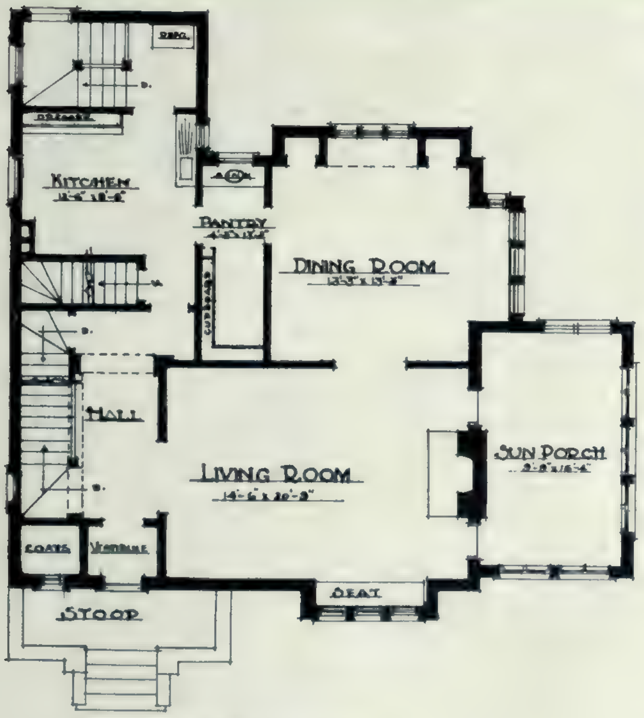


HALL, LIVING AND DINING ROOMS.

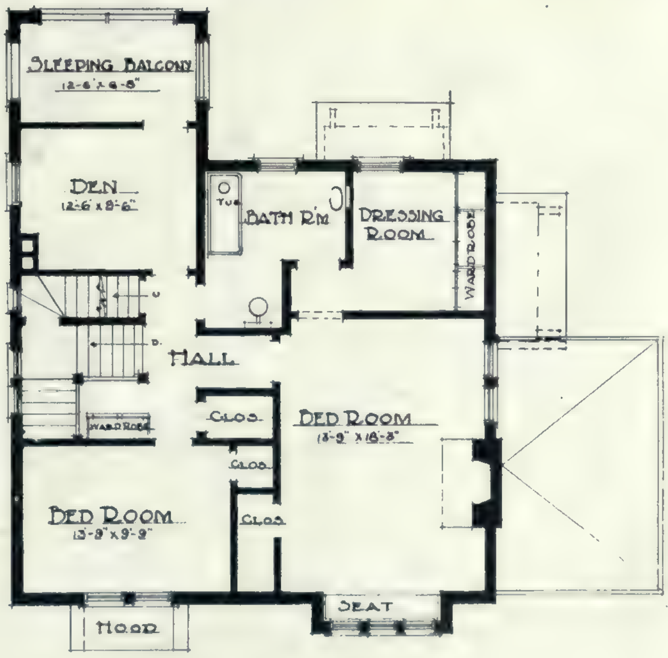
HOUSE NO. I, WINNIPEG, MANITOBA.

WOODMAN & CAREY, ARCHITECTS.





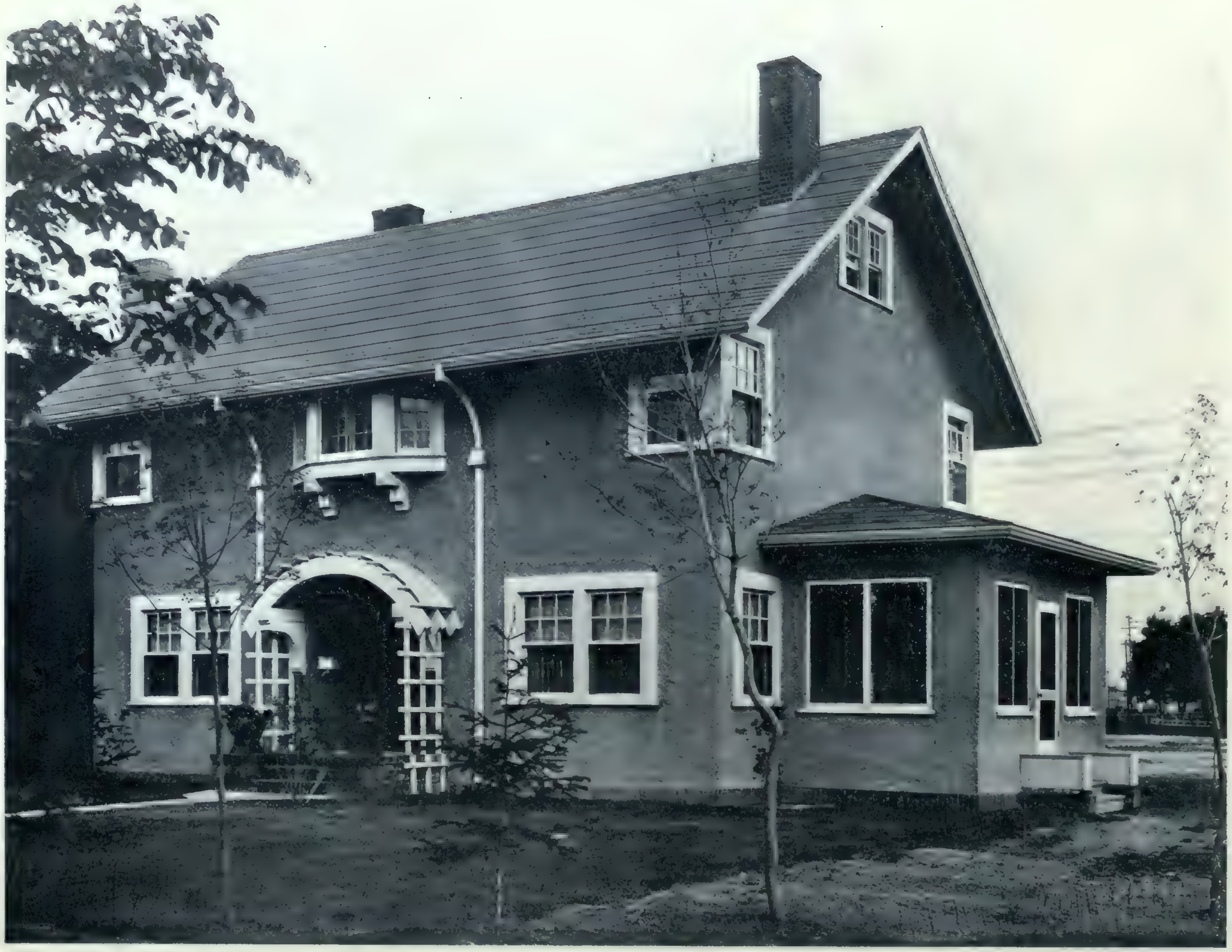
FIRST FLOOR PLAN.

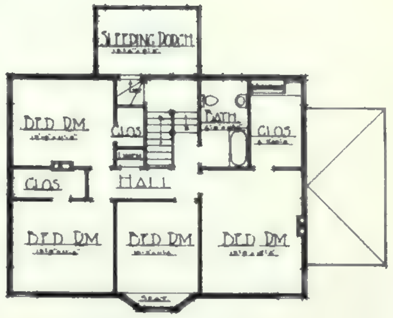


SECOND FLOOR PLAN.

HOUSE NO. II, WINNIPEG, MANITOBA.

ROSS & MACDONALD AND H. B. RUGH, ASSOCIATED ARCHITECTS.

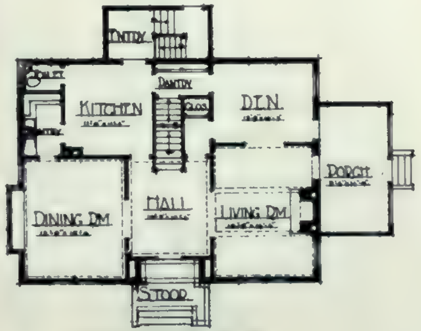




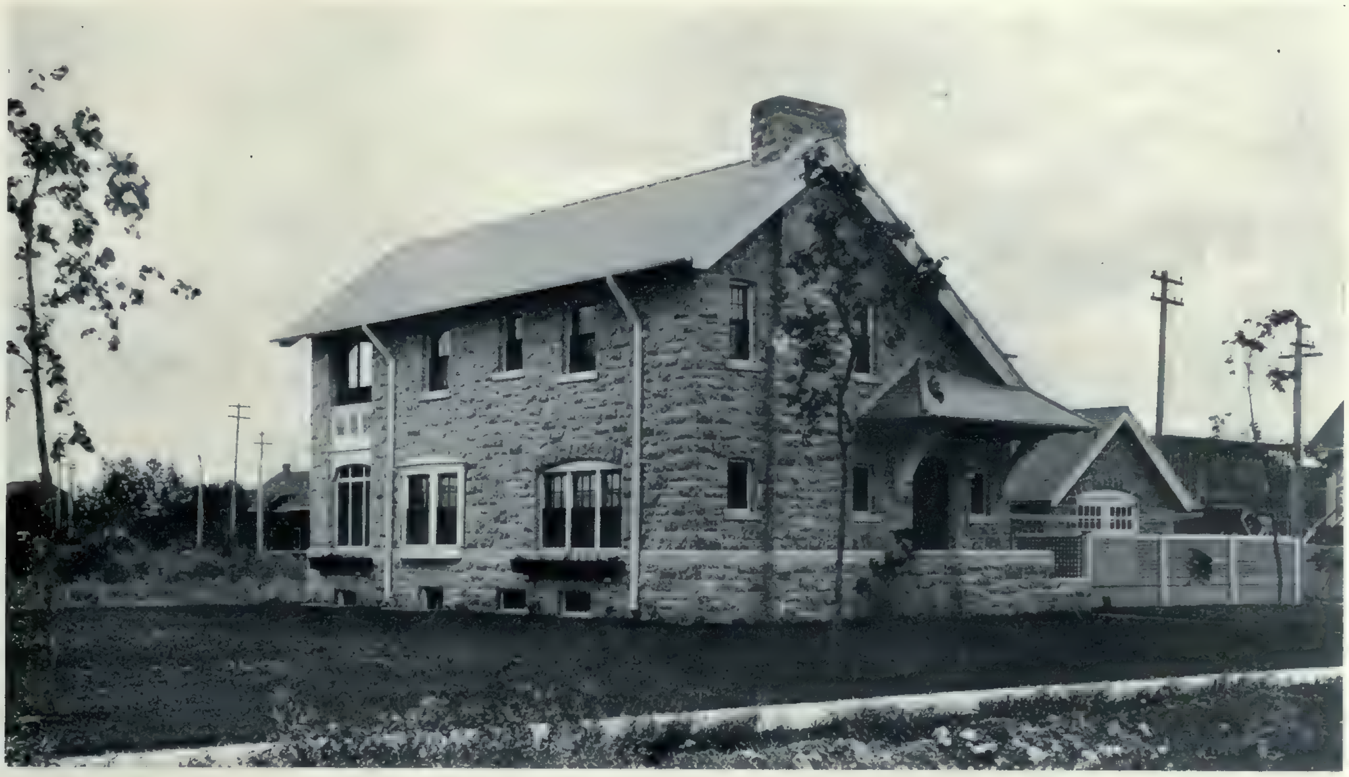
SECOND FLOOR PLAN

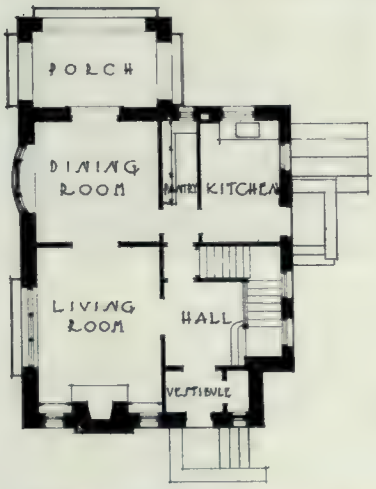
HOUSE NO. III,
WINNIPEG, MANITOBA.

ROSS & MACDONALD
AND
H. B. RUGH,
ASSOCIATED ARCHITECTS.



FIRST FLOOR PLAN

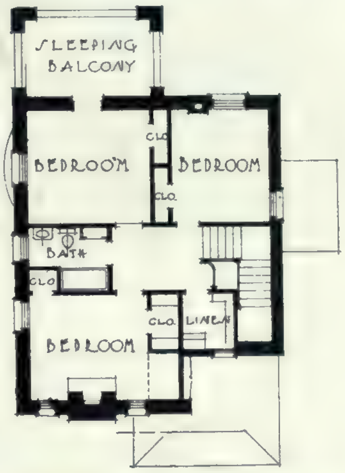




FIRST
FLOOR.

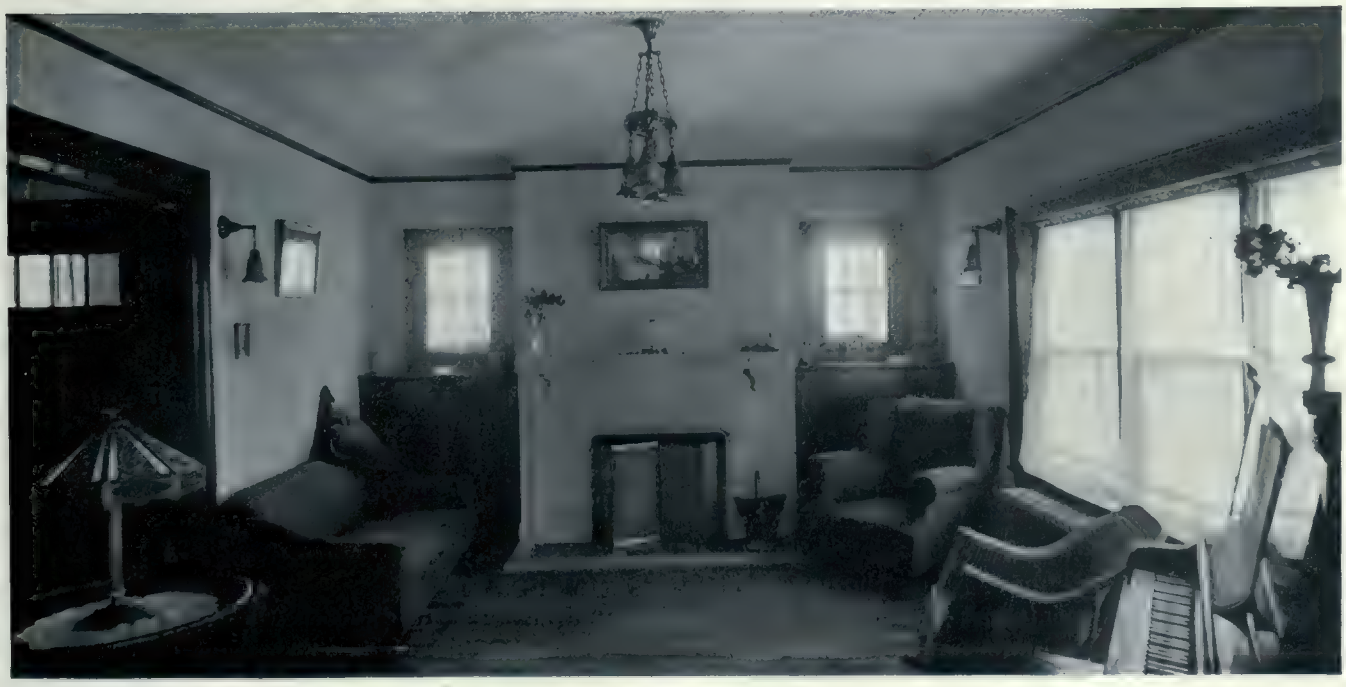
HOUSE NO. IV, WINNIPEG, MANITOBA.

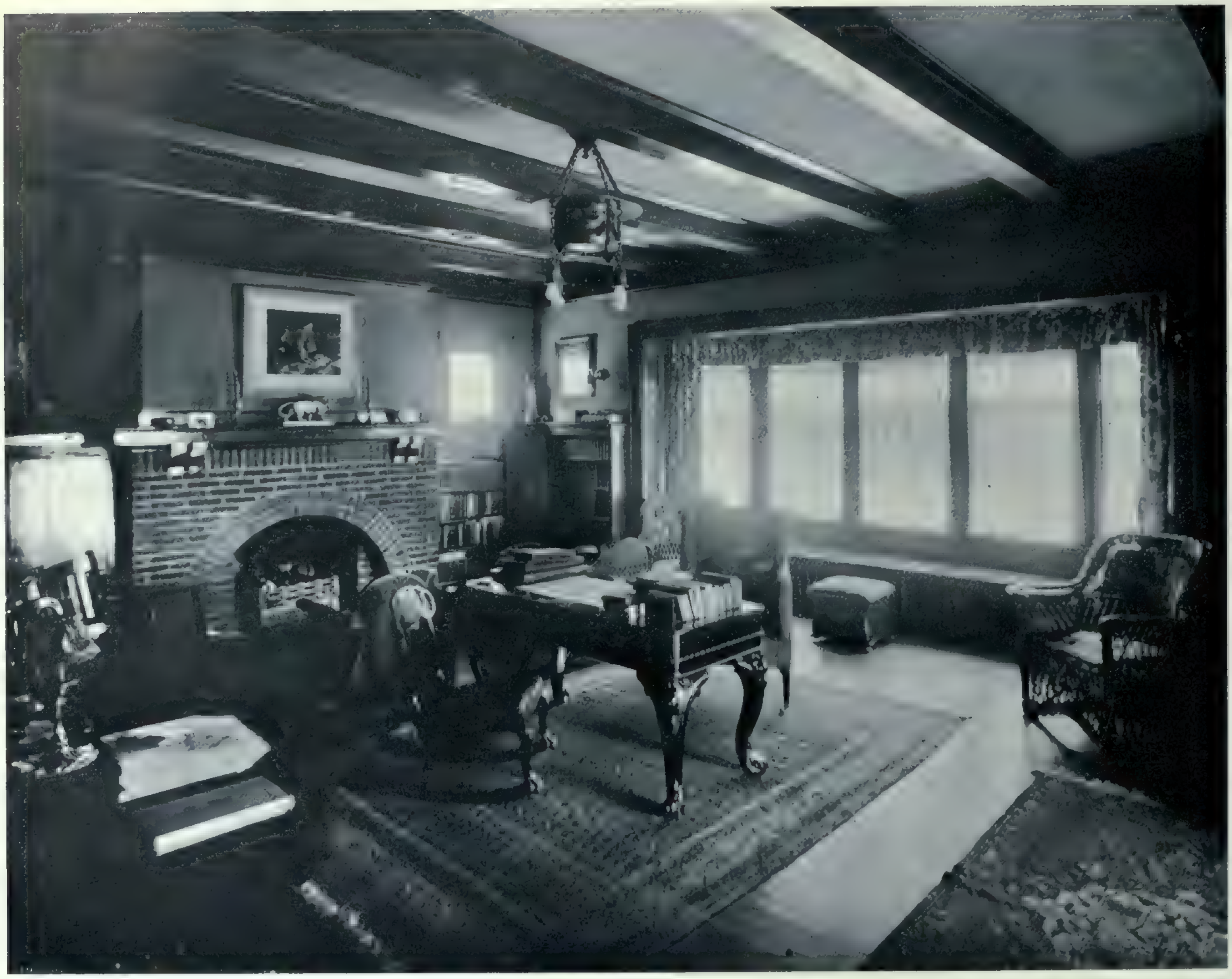
T. G. HOLYOKE,
ARCHITECT.



SECOND
FLOOR

LIVING ROOM.





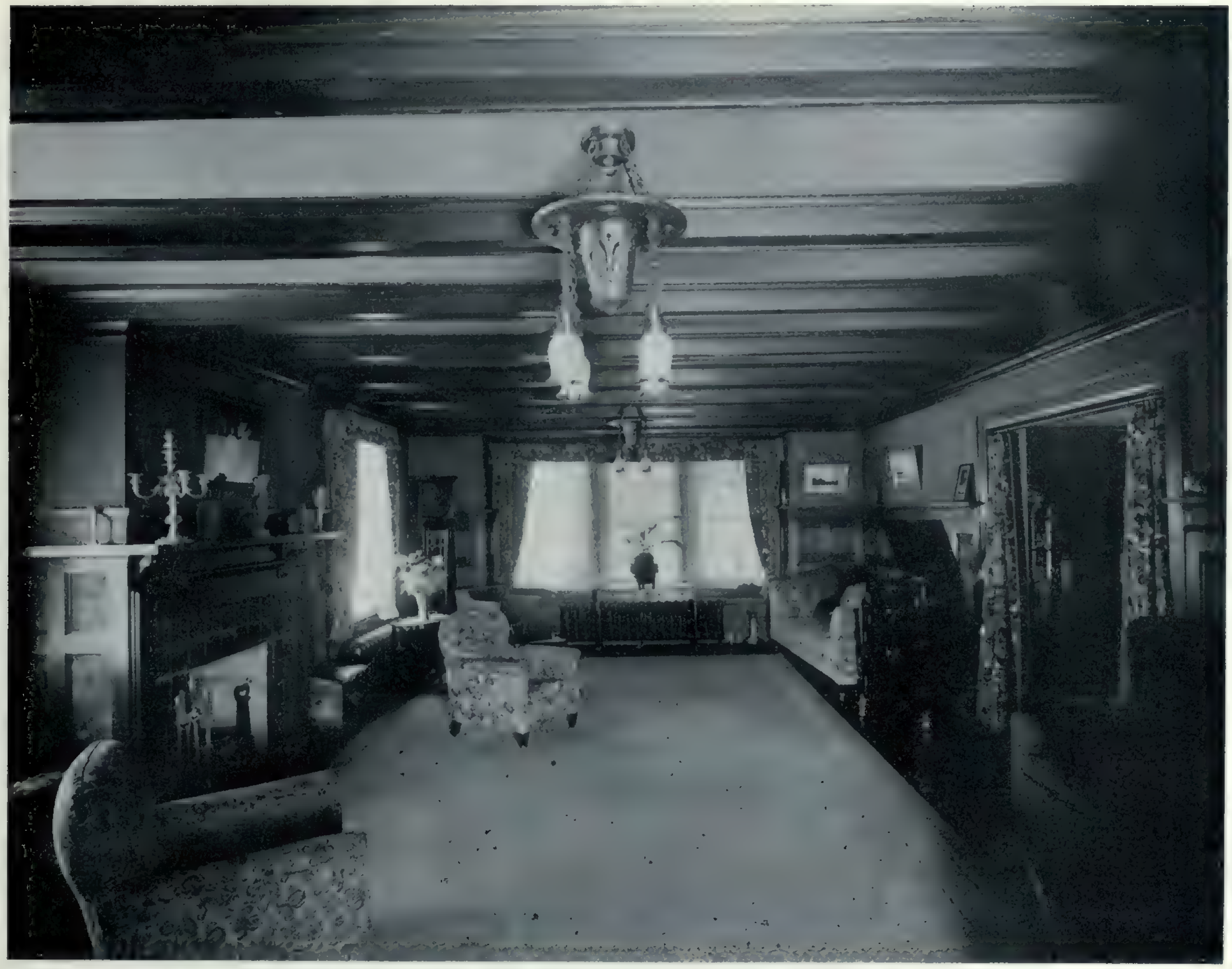
LIVING-ROOM, HOUSE NO. VI.

flagged terrace across the front. The materials used in construction are of the simplest. The house is built of brick with roughcast finish; narrow brick quoins set out a trifle from the face of the plaster appearing at the corners and giving an effect of quaintness in keeping with the general design. A point to be noticed in the roof treatment is the way in which the shingles are laid, the usual and it might be said the natural method of placing same is rather forced from the accustomed line. The shingles in the body of the roof are cut and laid irregularly, which seems to soften the texture of the covering, while at the gables several thicknesses of shingle give a heavy line rather like tile. The effect produced is perhaps worthy of the effort, as it seems to be entirely in keeping with the character of the design. The house owes much to its coloring, subdued and pleasing, with a weathered appearance which suits the house admirably. The wood work is stained brown except for the window frames, which are green. Overlooking the lawn at the back of the house is a narrow porch and above this is the usual sleeping balcony, the treatment making this feature more of an adjunct than a part of the main body of the house.

The living room is panelled in brown oak with a moulded frieze and capping in connection with a white plaster cornice; the oak capping breaking out over the window heads to form a canopy for the window curtains. The ingle at the end of the room is furnished with built-in settees, above which are recesses for bookshelves. The dining-room woodwork is white, the walls being a plain grey finished with a white plaster cornice. The treatment of the bay is very pleasing and a noticeable feature is the way in which the trim is dropped below the head of the frame to form a canopy for the curtains. The hall is treated in a manner similar to the living-room. The second floor woodwork is simply detailed and finished in white enamel.

Starting with a bare prairie lot, it can easily be seen how much a house of this kind will be improved when the planting about it has had an opportunity to grow and provide an appropriate setting. The cost of this house was approximately $15,000.

Houses Nos. II and III, Oxford Street and St. John's Avenue; Ross & Macdonald and H. B. Rugh, Associated Architects.—The square type of plan which in the small house is so satisfactory both as regards arrangement and economy is exemplified in this design and also in the

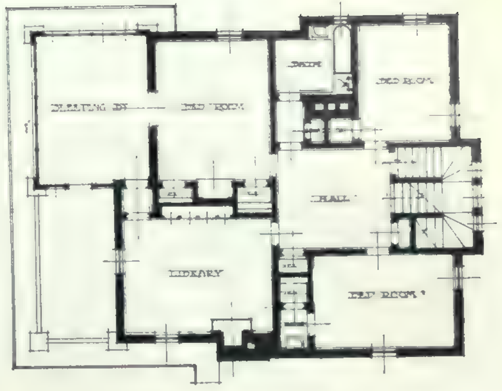


LIVING-ROOM, HOUSE NO. V.

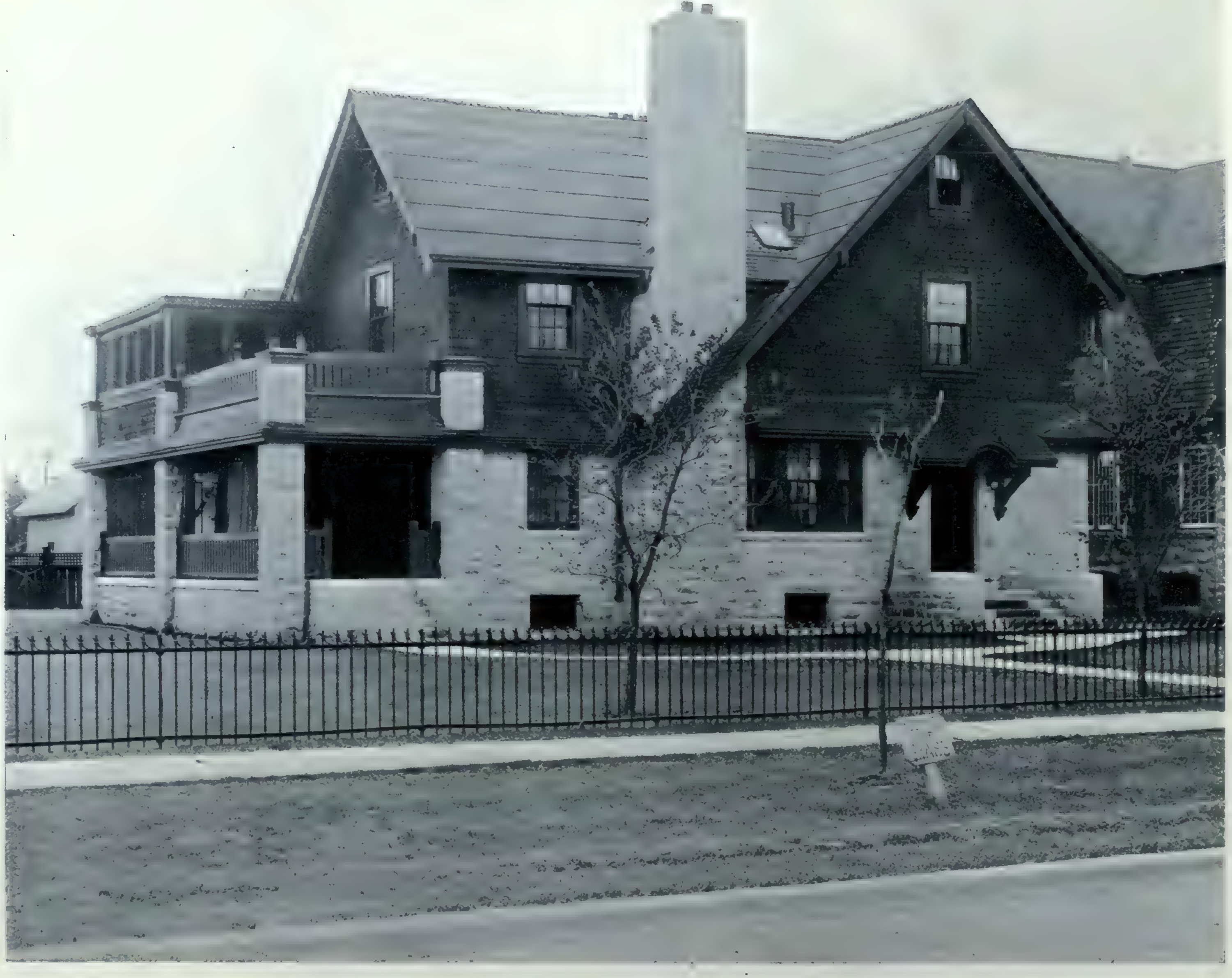
house at 1 St. John's Avenue. Simple masses and straight lines are relieved by some feature such as the entrance, which is usually the centre of interest and is elaborated for that purpose. Both houses are of frame construction with roughcast finish.

The house at 184 Oxford Street is set on a deep toned brick base, the lawn being terraced at the front while an area window gives light to the basement room. A neat wood fence serves to connect the small garage with the house, heated from the same steam heating system. Opening from the tiled vestibule is a convenient coat room and the hall is separated from the living-room by sash doors. Except for the dining-room the interior finish is white enamel throughout. The living-room has been decorated with a golden yellow as the predominating color in the scheme, while the dining-room is most attractively finished in mahogany, the walls a delft blue. The floors are straight oak downstairs and maple in the upper storey. In the course of time the severe outlines of the house will be softened and improved by the growth of vines and trees, the need for which is so apparent. The cost was approximately $10,000.

Similar in construction and design to the house on Oxford Street, the home on St. John's Avenue owes much of its attractiveness to the charming entrance feature with the corbelled bay centered over it. Boxes for flowers are set in the sides of the recessed entrance, adding still more to its inviting appearance. The windows in the corners of the upper storey have a somewhat disturbing effect on an otherwise quiet and harmonious composition, and are of doubtful value in the rooms they light. The plan is simple and direct, no doubt accounting in a large measure for the low cost of the house, which was seven thousand dollars. The living-room is finished in light oak with beamed ceiling and oak mantel; the fireplace being faced with brick in an ornamental pattern. Sash doors divide the den from the living-room, also the dining-room from the hall, a feature which has considerable to commend it in a small compact plan, adding as it does to the apparent size of the rooms. The dining-room with strip panelling and plate rail has a sideboard built into the square bay. The upper floor woodwork is finished in white, the floors of maple. No residence nowadays being complete without a sleeping porch, this feature is built over the rear entry and increased in size by corbelling on wood brackets over the wall below. The house has a

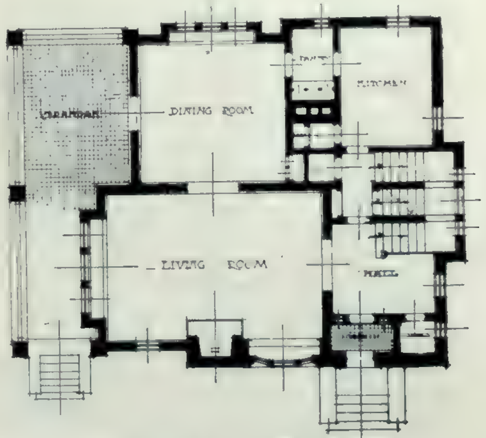


SECOND FLOOR PLAN

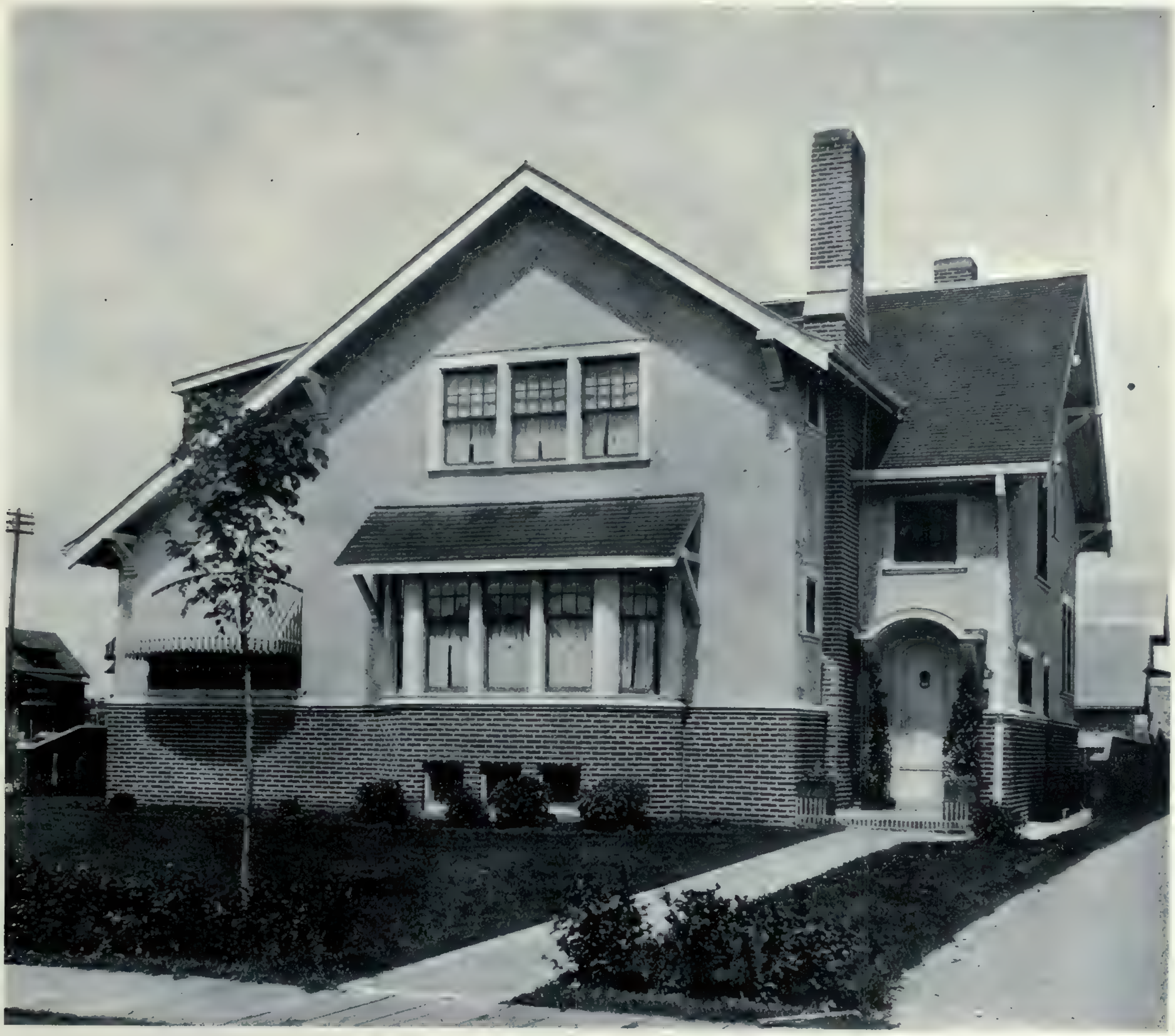


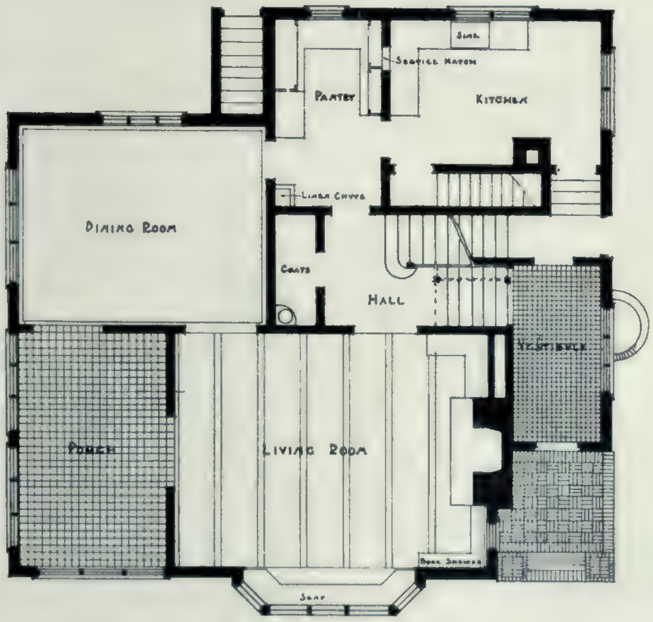
HOUSE NO. V,
WINNIPEG, MANITOBA.

J. N. SEMMENS,
ARCHITECT.

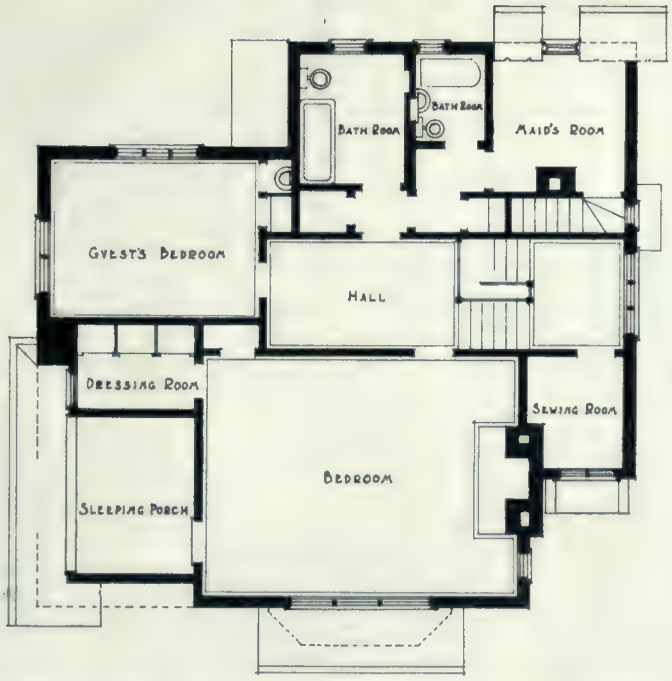


GROUND FLOOR PLAN





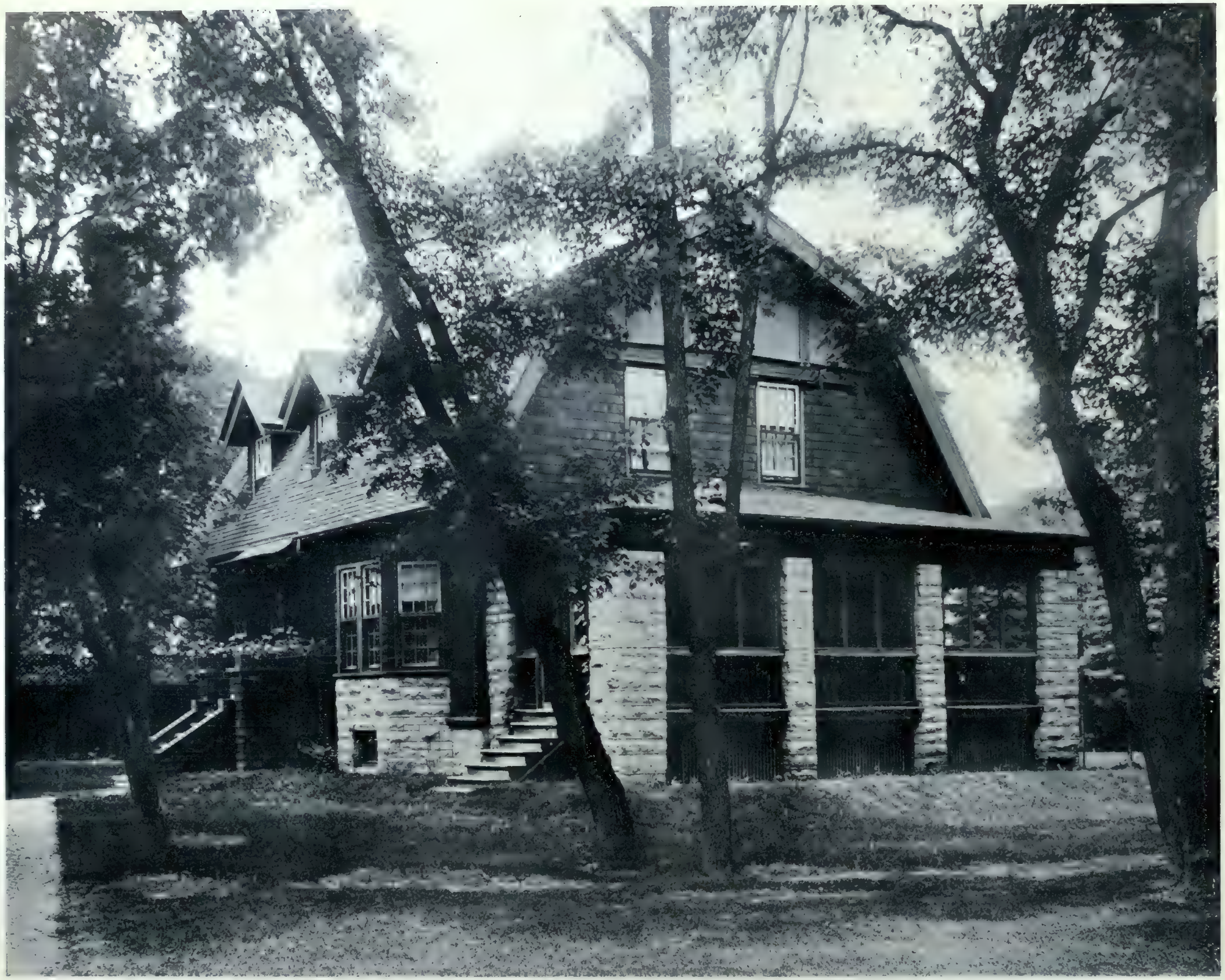
FIRST FLOOR PLAN.

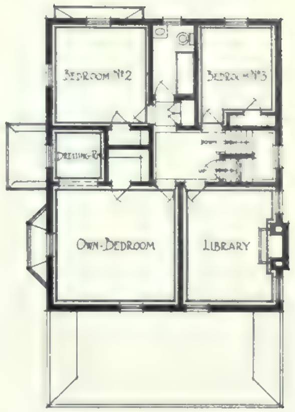


SECOND FLOOR PLAN.

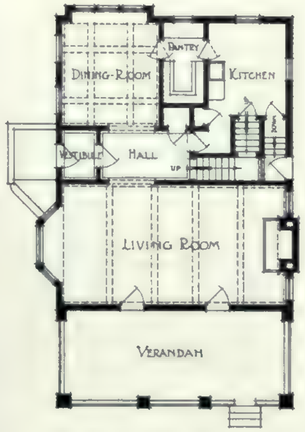
HOUSE NO. VI, WINNIPEG, MANITOBA.

JOHN D. ATCHISON & CO., ARCHITECTS.





SECOND FLOOR PLAN.



FIRST FLOOR PLAN.

HOUSE NO. VII,
WINNIPEG, MANITOBA.

D. W. F. NICHOLS,
ARCHITECT.

vapor steam heating system and, as stated before, cost $7,000.

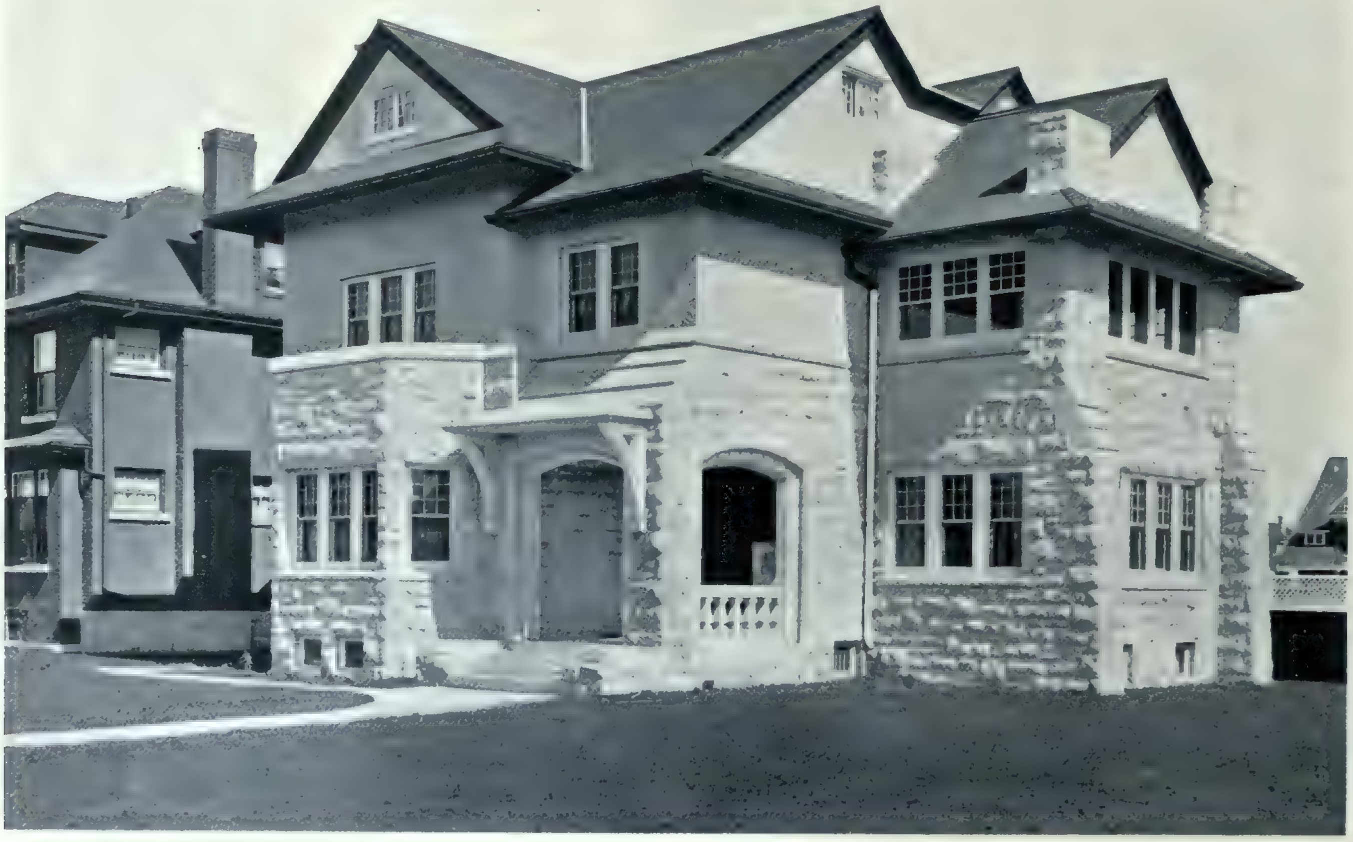
House No. IV, on Dromore Avenue; T. G. Holyoke, Architect.—This house is interesting both because of its plan and the material in which it is constructed. The solid stone masonry gives a substantial character to the building, which affords a welcome relief to the eye when so many of our smaller houses are of less enduring material. The simple lines of the exterior and the heavy hood at the entrance agree well with the material used. The side elevation is hardly so satisfactory as the front, the treatment of the various openings not seeming to harmonize well and giving a rather doubtful appearance. In plan the layout is simple and direct, and by the arrangement of living-room, dining-room, and porch the small area is very much increased in usefulness and sense of space. The stone fireplace is in good scale with the room and crisply detailed, making a very attractive feature in the room. Throughout, the house is well finished both from the point of view of material used and detail. The main ground floor rooms are treated in oak, the walls grey plaster with sand stucco finish; the small but well arranged kitchen is in birch. Upstairs birch in the natural finish is again used excepting in one bedroom, which is in white enamel. At the rear is a one-car garage, also built of stone and roofed like the house with slate. The cost was approximately $12,500 without the garage.

House No. V, at corner of Kingsway and Guelph Streets; J. N. Semmens, Architect.—Somewhat more pretentious in type than the other houses illustrated in this article, the architect has designed a pleasing combination of local stone and dark colored shingle and wood work. Informal, yet well balanced, the house presents a straightforward and homelike appearance. The low set roof and the treatment of the shingled hood which runs around the building at the second floor level add to the character of the house. In the hood is found a good solution of the problem of changing from the stone veneer to the frame construction above. The verandah across the end of the house is well considered, the sleeping porch above being frankly and boldly treated without any detriment to the design. The living-room is comfortable and roomy, with a low oak-beamed ceiling, having a fireplace with oak mantel at the left of which is a triple window containing a built-in seat, and all lending a note of informality which adds much to the room. Opening from the living-room, the dining-room is finished in white with a built-in china cabinet and an ornamental plaster ceiling; from the dining-room wide doors lead to the screened verandah. Upstairs is the owner's library, panelled in oak; the remainder of the floor being of white enamel finish with birch mahogany doors. In the principal bedroom is a built-in dressing table with a large mirror above. The house was built for $14,700.

House No. VI, on Kingsway Avenue; John D. Atchison & Co., Architects.—This house, with its nicely intersecting gables and roof lines, presents a quiet and pleasing composition of which not the least satisfactory part is the entrance, with its low hooded door in contrast to the tall brick chimney set close beside it. The light red tapestry brick, white roughcast and wood work and soft green roof form a color combination admirably suited to the intention of the design. The inevitable sleeping porch is rendered as unobtrusive as possible by a sort of dormer treatment. The requirements of the plan called for few rooms, and consequently these were made fairly large, particularly the living-room and owner's bedroom. The three principal rooms on the first floor are pleasingly arranged, little space being wasted in the hall, while there is an ingeniously contrived short cut from the kitchen to the front door. The living-room, dining-room and hall are carried out in oak; the sun-room in pine with white enamel finish; the upper story in white enamel throughout with floors of birch. This house cost $12,000.

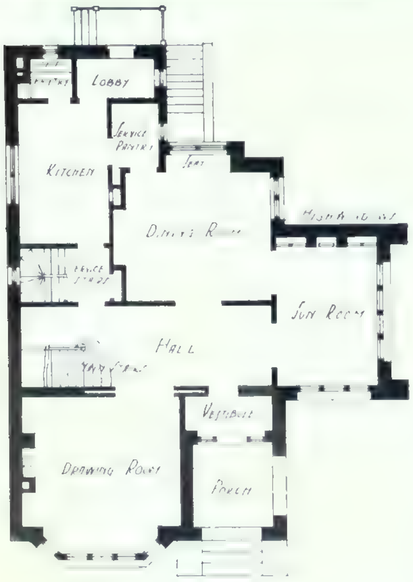
House No. VII, at Armstrong's Point; D. W. F. Nichols, Architect.—The familiar and somewhat overworked gambrel roof is here used with good effect, the combination of stone and dark wood work being harmonious in coloring and disposition, while the setting of the house among the trees completes a very attractive picture. The broad screened porch across the end of the house is a feature which adds much to the design both in the plan and in the elevation. The house is well arranged, though containing no features which are unusual in the small house. The living-room, extending the full width of the building, is finished in oak, light tobacco brown in color; the ceiling beamed, and the walls hung with golden Japanese grass cloth divided into panels with oak strips. Above the high panelling is a hand-floated plaster frieze. The fireplace has an oak shelf and red-green grueby tile facing furnished with hammered iron set and frame. The hall has a panel vault ceiling and plaster cornice wiped in oil; the trim of oak with silk covered walls of a light golden yellow color. The dining-room is panelled similarly to the living-room, the material, however, being duck tinted a Delft blue; the second floor bedrooms finished in white enamel with birch mahogany doors, and the library having an oak trim and mantel. The house is steam heated and built for approximately $6,500.

House No. VIII, on Yale Avenue; Jordan & Over, Architects.—Although this house may readily be classed as a small house, the design of the exterior is perhaps not quite in keeping with the plan. The sun porch and sleeping balcony on the west side is treated rather heavily, the store buttresses carried up through the roof not making a very happy composition with the roof lines. The substantial appearance of the house is noticeable again in the interior, which is well finished throughout. The hall has a low oak dado which is carried up the stair and around the upper halls. A feature of this hall is the well proportioned bay window on the stair landing, which is also very successfully treated on the exterior. The dining and sun-rooms are panelled in oak, the former equipped with a built-in sideboard, while the sun-room, whose panelling extends to the height of the doors, has a beamed ceiling with close set heavy oak beams. The living-room is finished in mahogany, enriched with a fireplace of Bedford stone. The second story rooms are in natural birch and white enamel, the floors of birch. Except where sash doors are used opening from the sun-room, the doors are flush veneered with a narrow stripe inlaid to form a single panel. The upper floor is simply finished and the rooms are bright and cheerful. The house was built at a cost of $15,000.

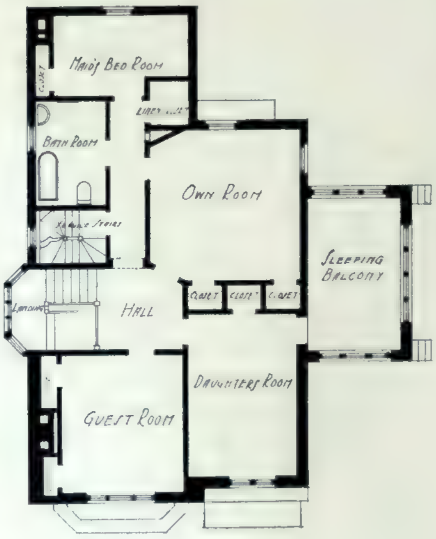


HOUSE NO. VIII,
WINNIPEG, MANITOBA.

JORDAN & OVER,
ARCHITECTS.



GROUND FLOOR.



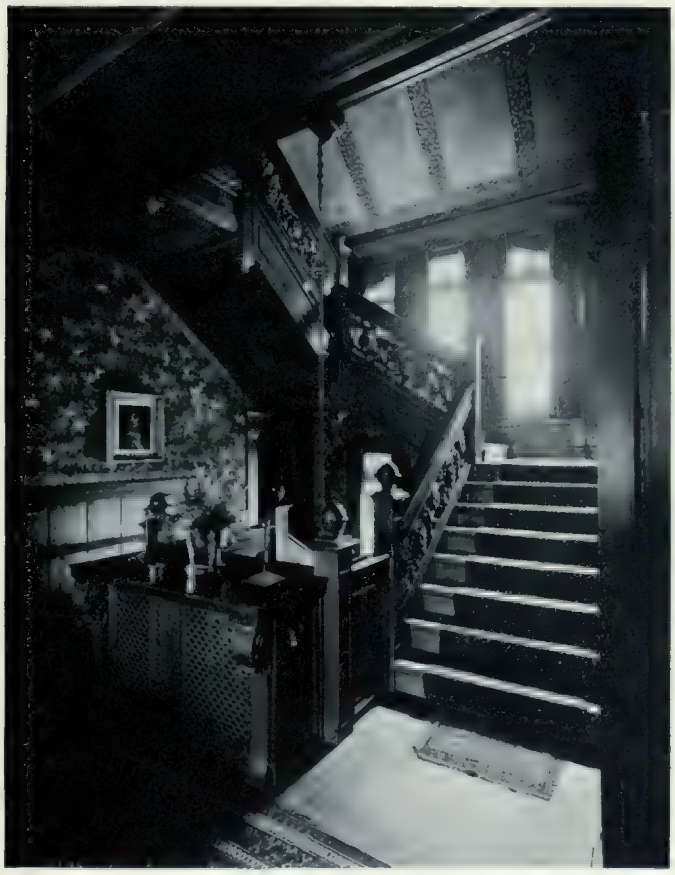
SECOND FLOOR.

Residence on Drummond Street, Montreal

EDWARD & W. S. MAXWELL, Architects.

THE house belonging to J. T. Davis is beautifully situated at the head of Drummond Street adjoining Mount Royal Park. The exterior shows a restful treatment on Elizabethan lines, the old fashioned Harvard red brick being relieved by a reasonable use of Indiana limestone. Contrary to the Montreal custom, Mr. Davis secured a beautifully wooded property of considerable size, the result being a setting of unusual charm and homelike appearance.

The plan is arranged so that sunlight enters all of the living rooms, as the main facade faces almost due south. The main entrance is by means of a flight of stone steps, and a loggia leading into a vestibule 9 by 17 feet. The walls of the vestibule are of artificial Bottichino marble agreeably laid out in panels of Louis XVI character, the floor of grey Tennessee marble with a bronze inlay. The entrance and vestibule doors have bronze grilles set into the oak framing. Furniture of carved oak treated with color and an antique gilt mirror relieve the quiet key-note of the marble treatment. From the vestibule one enters a large coat room with lavatory accommodation at the left, while on the right a door leads to the reception room, an arrangement of plan which gives privacy to the living hall, and in a large house is preferable to the more usual scheme of being obliged on all occasions to enter directly from the vestibule.

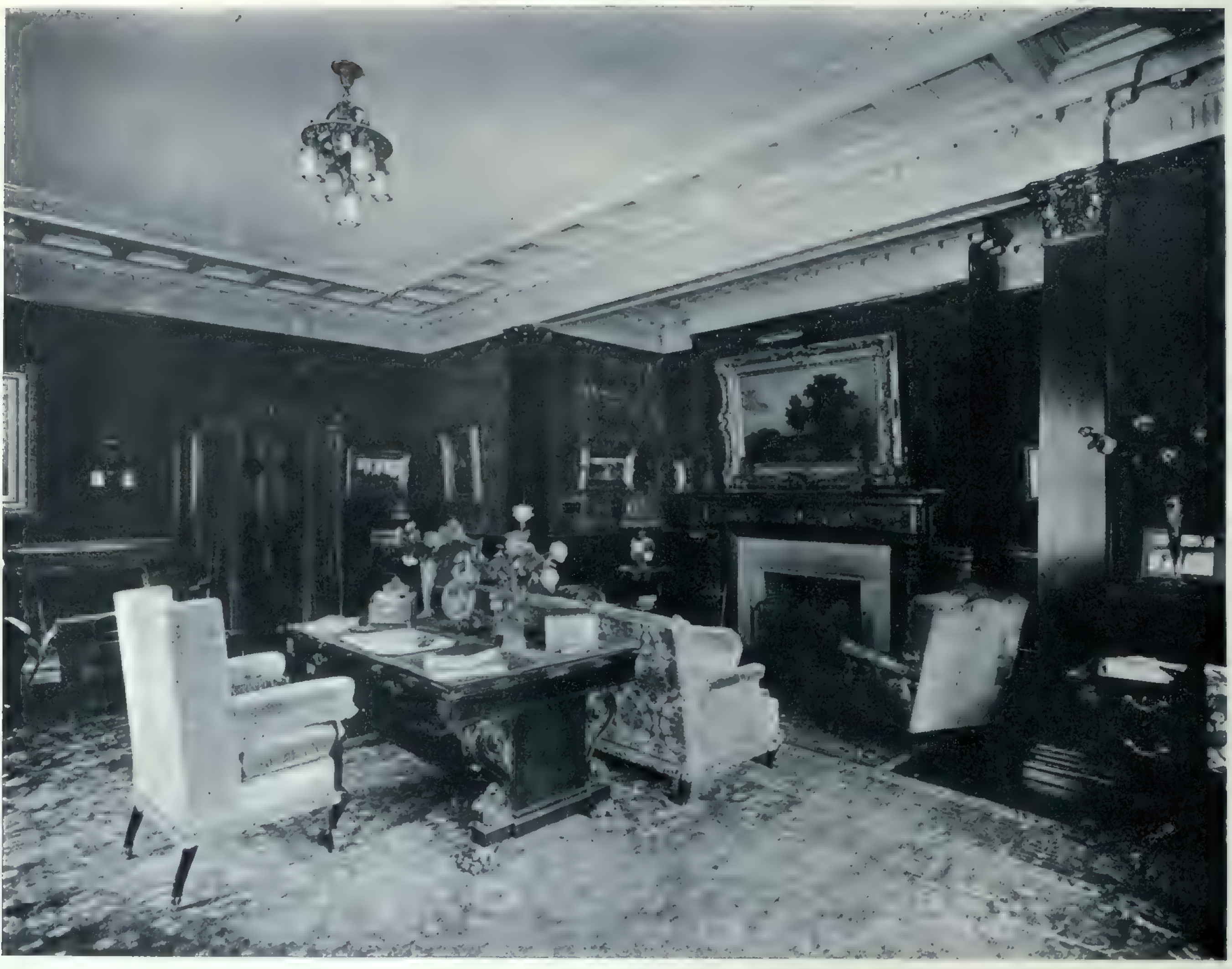


SECOND LANDING OF STAIRCASE HALL.

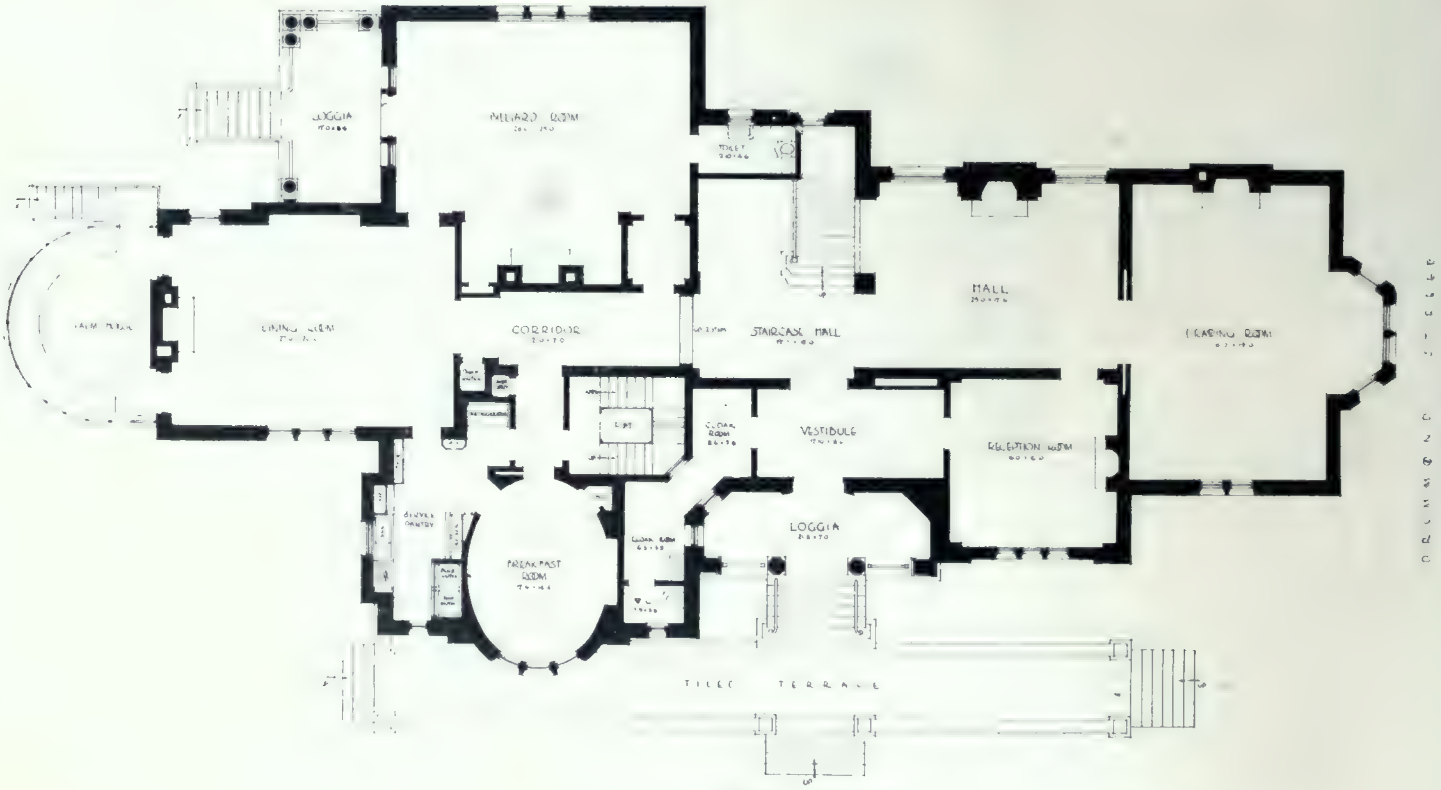
The drawing-room, nineteen by twenty-eight feet, extends across the end of the house and is entered from the hall. Louis XVI panelling, splendidly carved, provides a suitable environment for the more formal occasions. The treatment of the hall, main staircase, and ground floor corridor is rather English in character. The panelling extends to above the level of the doors, and the simple carved frieze of flutes and varied rosettes, enhances the qualities of the panelling which is divided into squares without mouldings. The dominating feature of the hall is a large "Hopton wood" stone mantel flanked by a seat fender of wrought bronze. The wall space between the cornice of the panelling and the beamed ceiling is covered with verdure tapestry, while the curtains are of an antique red velour which recalls the tones of the Persian rugs. The ceiling panels are stencilled, and worked over with glazes on a ground of aluminum applied over the sanded plaster, the effect being quiet and rich because of the simple color scheme.

The staircase balustrade has panels of pierced scroll carving; the piers at the start of the staircase having Hopton wood stone built into the brick construction work. Carved stone consols of varied design receive the oak beams of the ceiling. The color scheme of the hall extends up the staircase to the top floor, furnishing at the first floor level a rather agreeable effect, the hall extending through the house to the main wall over the entrance. By this means a small well lighted sitting-room is obtained.

The reception-room has a painted panelled dado, the wall space over being divided into panels which are covered with a grey wall paper. The mantel piece is of white marble slightly antique and relieved with a rose antique facing and panels, the details of which are exquisitely carried out, and reproduce faithfully the spirit of late eighteenth century English work. A well modelled plaster frieze and ceiling recall in some of the details the key-note given by the mantel. The polished and engraved steel grate and fender are reproductions of old work.



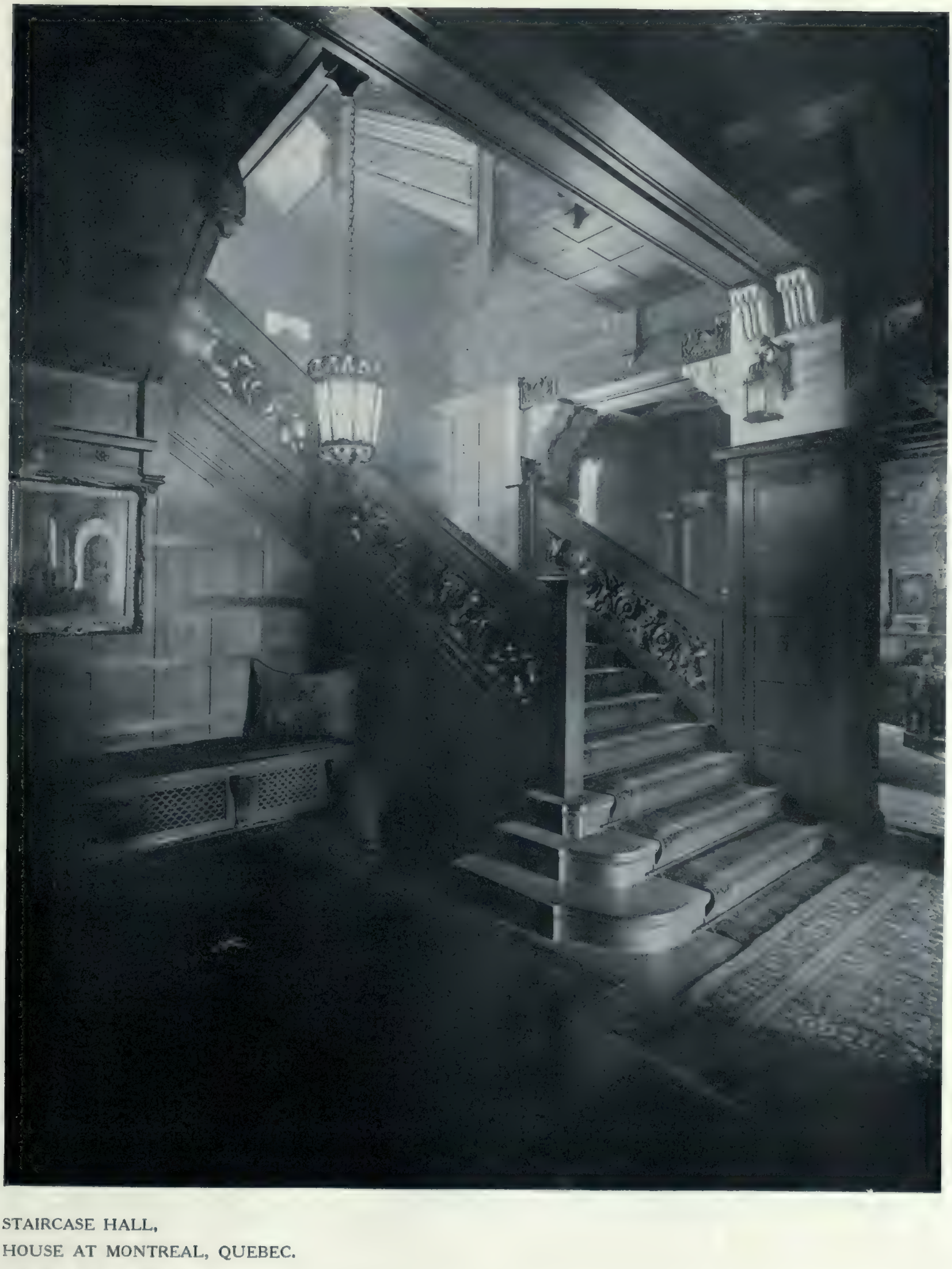
LIBRARY.



• GROUND FLOOR PLAN •

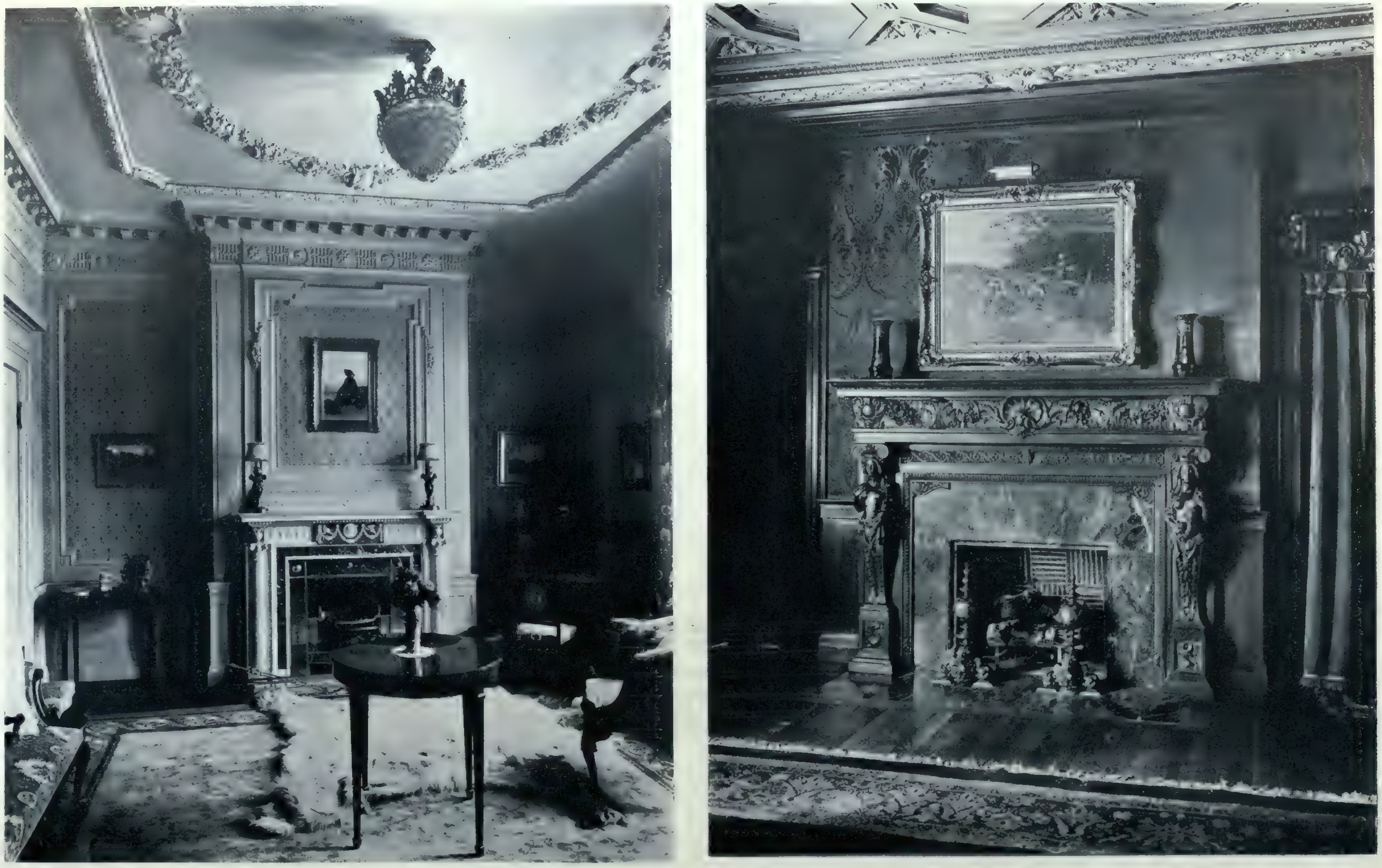
HOUSE AT MONTREAL, QUEBEC

EDWARD & W. S. MAXWELL, ARCHITECTS.



STAIRCASE HALL,
HOUSE AT MONTREAL, QUEBEC.

EDWARD & W. S. MAXWELL,
ARCHITECTS.

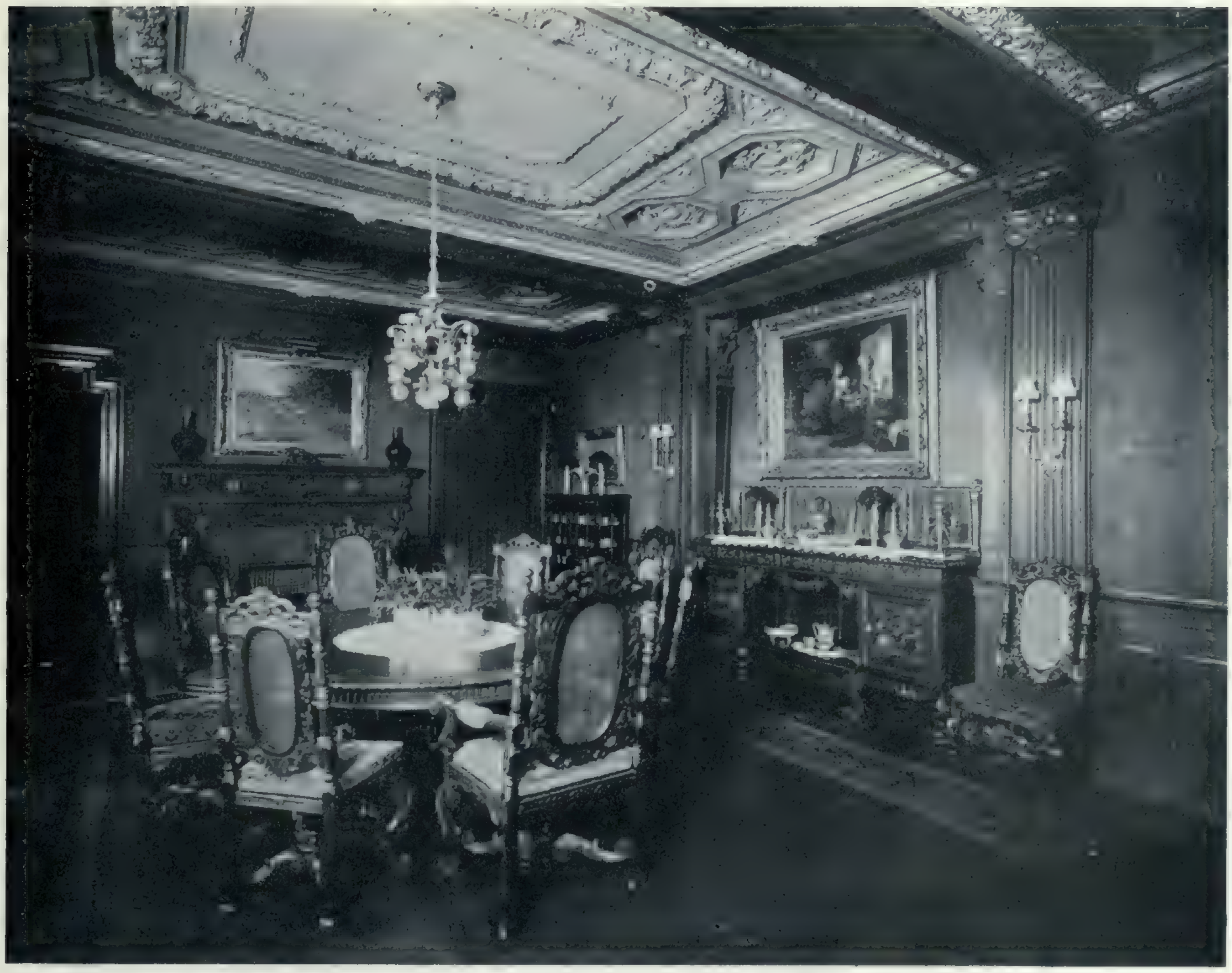


RECEPTION ROOM.

DINING ROOM.

TWO FIREPLACES IN HOUSE AT MONTREAL, QUEBEC.

EDWARD & W. S. MAXWELL, ARCHITECTS.



DINING ROOM.

The dining-room at the rear of the house is a free treatment of seventeenth century English work, and is a suitable setting for the Jacobean chairs and furniture. The dado of antique oak sets off to good advantage the interesting wall material of old red and dusty gold silk, a reproduction of one in the Vatican, the antique qualities of the original being skillfully reproduced. The curtains are of plain uncut silk velour with a background of deep old gold, the effect approximating in color the wall hangings, the electric fixtures of antique silver. The plaster ceiling has a treatment of octagonal caissons extending around the walls, the large centre panel being surrounded by decorative mouldings. The mantel facing is of Alps green marble and the caryatides supporting the shelf delicately modelled.

BED ROOM.

BED ROOM.

VESTIBULE.

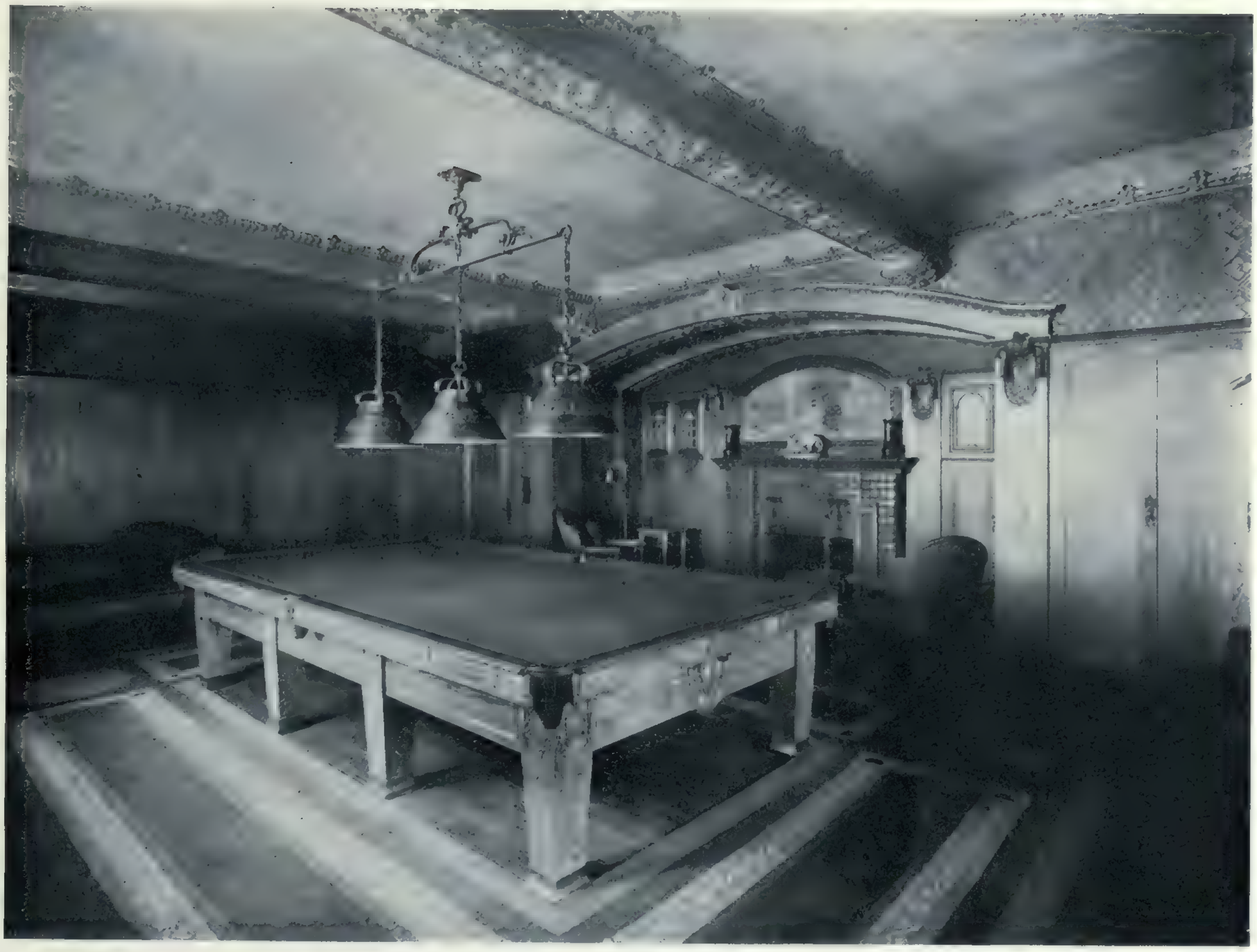
HALL.

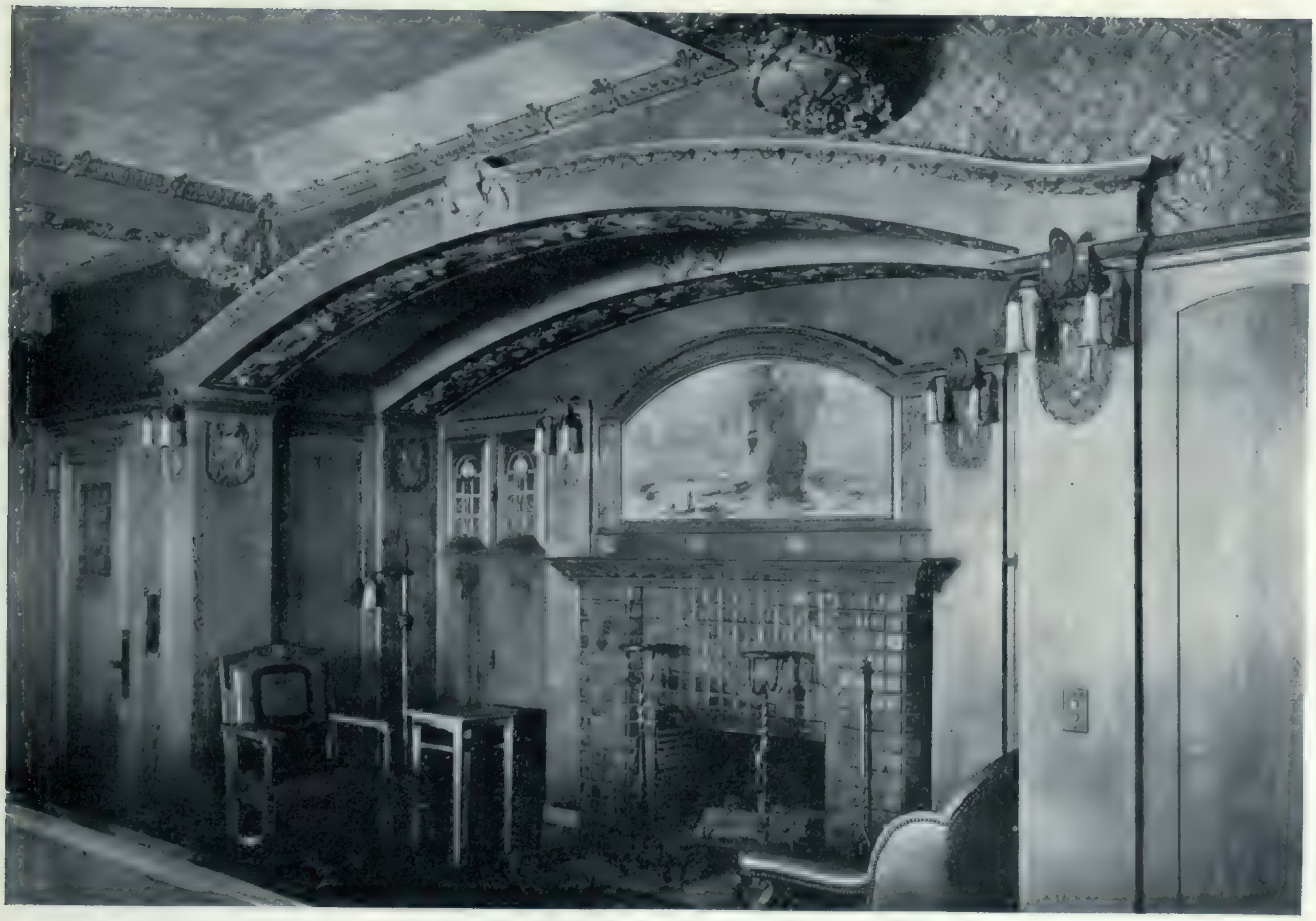
Opening off the dining-room is a palm-room. In the centre of the semi-circular end is a fountain and basin of faience, modern in character and showing a skilful use of matt surface material. Around the exterior walls are two rows of plant shelves, with perforated grilles of green faience. The floor and walls are also of faience.

Adjoining the dining-room is an oval breakfast-room with wood panelling painted a matt surface greyish white. The domed ceiling of smooth plaster has an interesting painted decoration just above the cornice level. The motif was developed from old Faience de Rouen, a soft light blue predominating over the other colorings, and the decoration being glazed with zinc white, thus achieving an indefinite and interesting effect, which unfortunately does not show on the reproduction. Late eighteenth century mahogany furniture and a Savonnerie rug with a blue centre, all contribute to make this a cheerful and restful room.

The billiard-room is entered from the hall corridor by means of a panelled vestibule which shuts off all noise and serves as a telephone booth. It is rather difficult to label the room as being of any definite style. The walls have very simple chestnut panelling about seven feet six inches high, above which is grass cloth that has been stencilled on a background with a suggestion of gold dust. The coloring is that of the woodwork (a warm driftwood color) with harmoniously introduced tones of brown rather unevenly applied. On the wood pilasters are shields carved into the solid, each with a conventionalized animal or bird surrounded by leafage, while from the canopies over the shields wrought bronze arms support Tiffany glass shades. The shields are treated in color and gold and rendered antique.

The alcove has a mantel of hand-made brown tiles supporting a wood shelf with a simple inset mosaic of diamond shapes, rosewood and white mahogany being used. Over the mantel is an unusually successful painted decoration of sixteenth century ships, carried out by Maurice Cullen, R.C.A. The doors flanking the mantel have a design of iridescent glass on a colorless obscured glass background. The billiard table, electric fixtures, rugs and other furnishings were executed from the architects' designs or instructions. The general color effect of the room is that of driftwood browns





BILLIARD ROOM, HOUSE AT MONTREAL, QUEBEC.

EDWARD & W. S. MAXWELL, ARCHITECTS.

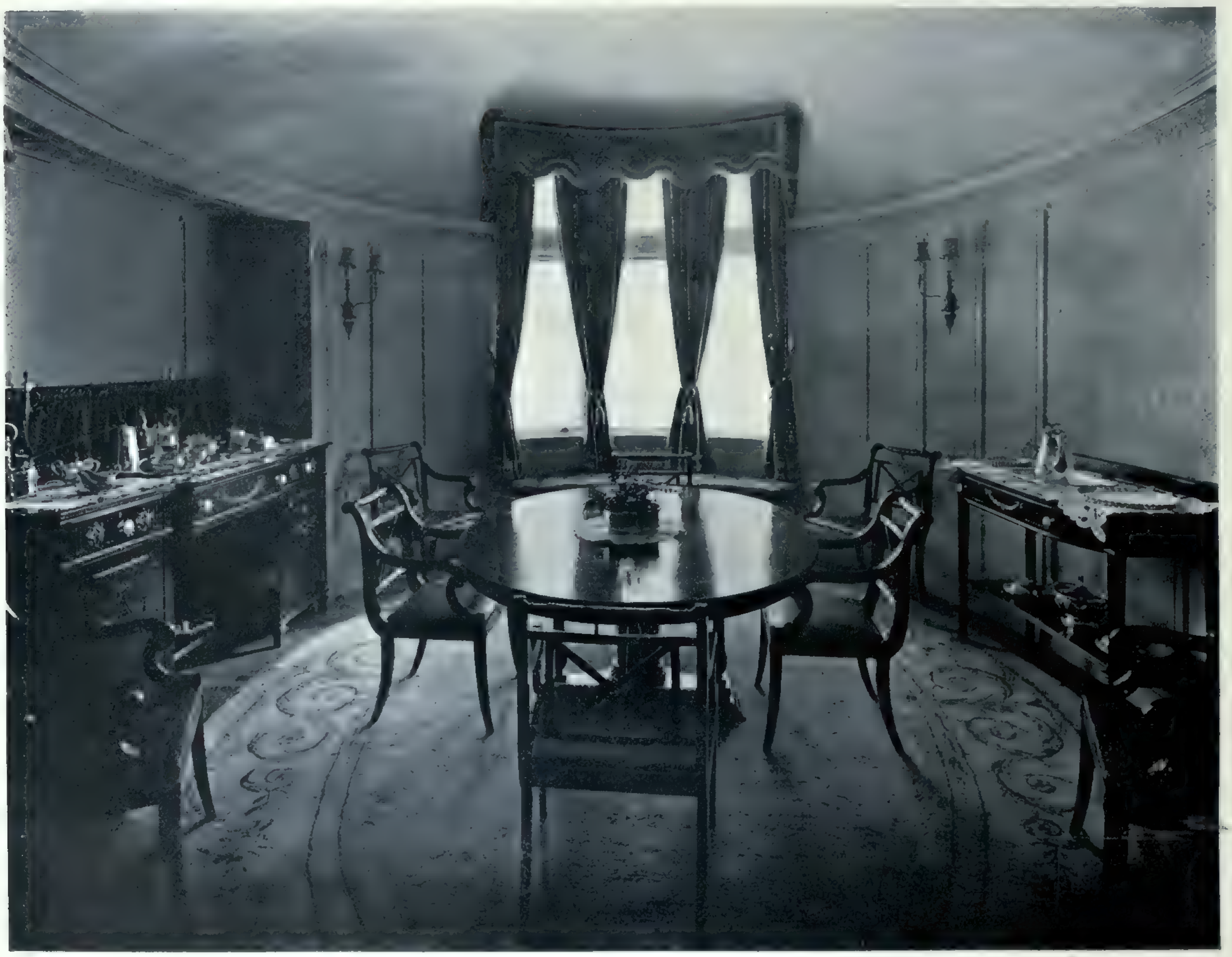
broken by blue notes and the subdued heraldic coloring of the shields. The windows have an Elizabethan pattern in lead glazing.

The library is situated at a lower level than the first floor, and is directly over the billiard room, access being from the second landing of the main staircase. The details of the room are Italian Renaissance. The dado and other woodwork is of mahogany; the walls hung with a blue velvet fabric having an almost invisible pattern.

The room is happily situated, readily accessible from the ground and first floors, and providing a refuge when the main part of the house is used for entertaining.

The first floor has four large bedrooms and three bathrooms, as well as dressing-rooms and the usual smaller service rooms. The attic has quarters for the governess and housekeeper, an isolated part devoted to servants' quarters, while in the front of the house are several bedrooms, etc.

The basement has a large kitchen tiled to the ceiling, the floor being of vitreous tile on which are laid rubber mats opposite the sinks, stove, etc. The balance of this floor is divided into the necessary pantries, furnace room, laundry, etc., such as are required in connection with a residence of this size. On the rear of the property, and facing Upper Mountain street, is a garage and stable with living quarters over.



BREAKFAST ROOM.

The changes that took place in the length of the flights of staircases are not without interest. In mediæval times, when staircases were of the corkscrew type, landings were sparsely provided, and in the nature of things they were small at the best—anything large would not only have interrupted the continuous spiral of ascent, but would have interfered with the already scanty headroom. With the introduction of the wood staircases of the late sixteenth century, a complete change took place. They were made of ample width, and in straight, short flights, seldom of more than six or eight steps; then came a quarter-landing, then another flight at right angles. These short flights remained in fashion nearly down to the eighteenth century. Occasionally winders had been employed, but not in the finest examples. With the eighteenth century the flights increased in length, containing twelve, sixteen, or even more steps; winders were more frequently used. Finally came the elliptical staircase, sweeping from floor to floor in one flight without any landings, and consisting wholly of winders, although as the radius of the sweep was longer, none of them were narrowed to an actual point.—*J. Alfred Gotch.*

HOUSE NO. I. DINING ROOM. HOUSE NO. IV.

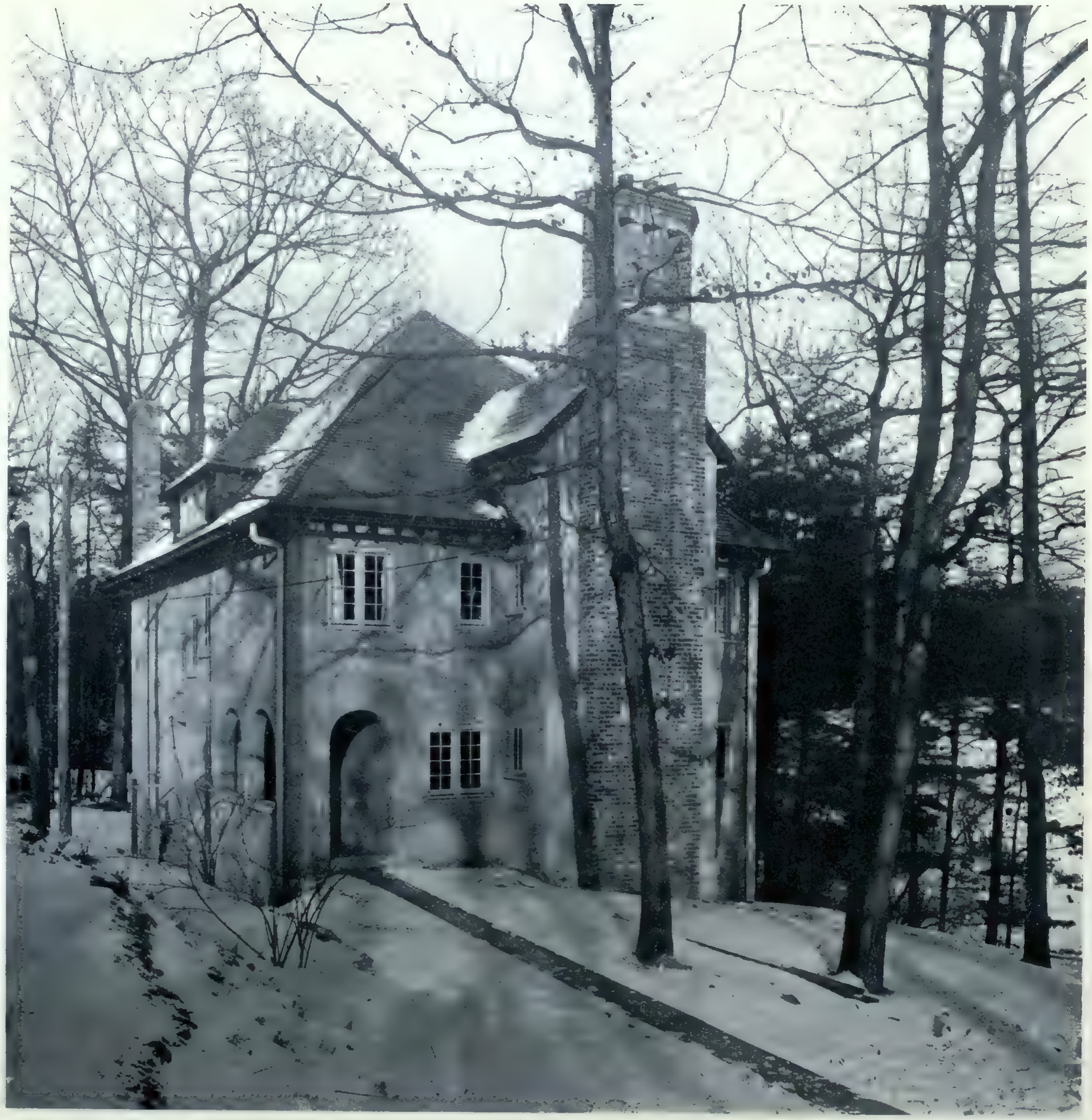
Houses in Toronto and Vicinity, Ontario

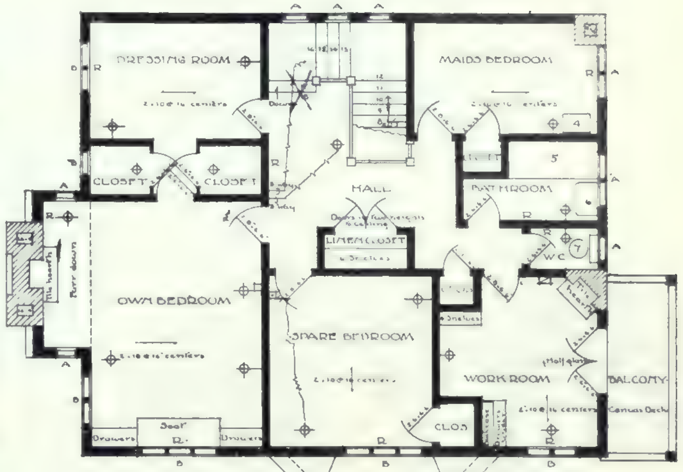
THAT the home is becoming a universal resultant of architectural beauty and taste can no longer be questioned. Each succeeding year shows the various problems handled ingeniously in respect to the general appearance of the house, the practical solution of its plan and its harmonious relation to the site and general surroundings. The following examples illustrate still further the elimination of offensive work and the upward trend towards buildings of artistic merit.

House No. I, Wychwood Park; H. Eden Smith, Architect.—The house is situated on a slope some thirty feet high, bordering a large pond, from which location it commands a magnificent view. The bay window in the dining-room overlooks this body of water, furnishing an additional interest to the attractiveness of the room, which opens on to the verandah. Built of hollow tile, the exterior is treated in gray stucco, which receives a much needed touch of color in the red brick chimney laid upon wide gray mortar joints. The dining-room walls are panelled to the ceiling in pine, with lighting fixtures in perfect harmony, while the living-room has oak panelling, brick fireplace and hardwood floors. A sleeping-porch leading from the hall provides one of the special features with stone flag flooring on reinforced concrete and tile coping. The ground falls away so rapidly towards the pond as to permit of a garage in the basement. Built at a cost of $10,000, the house has a hot water system and all other modern conveniences.

House No. II, Oakville; J. Francis Brown, Architect.—The approach to the house is by a straight driveway enclosed with an artistic arrangement of shrubs, flowers and trees. Lake shore stone constitutes the first story with deep recessed mortar joints; while above is gray stucco and wood stained a rich brown, terminating in a roof of Venetian red stained shingle. Upon the interior the living-room has a pleasing treatment of Southern pine, stained a rich dark brown, with gray stucco finishing all panels on the wall and ceiling. The house is located within two hundred feet of Lake Ontario, and, with the stable, motor house and other buildings presents a harmonious arrangement. It is a

HOUSE NO. IV. LIVING ROOM. HOUSE NO. VIII.

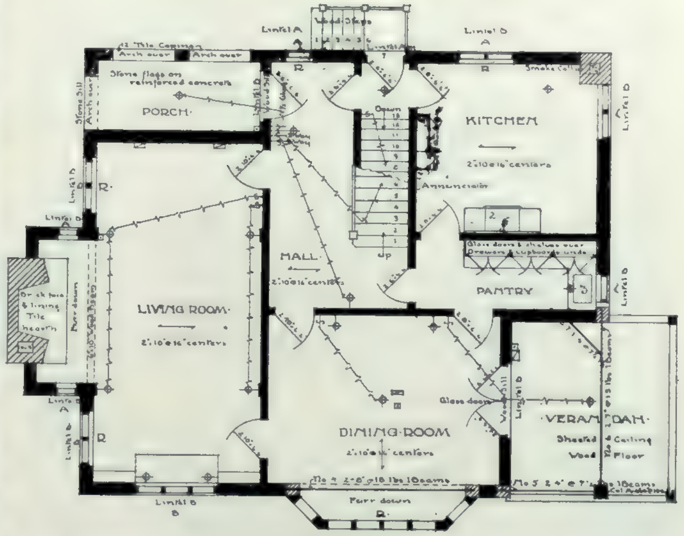




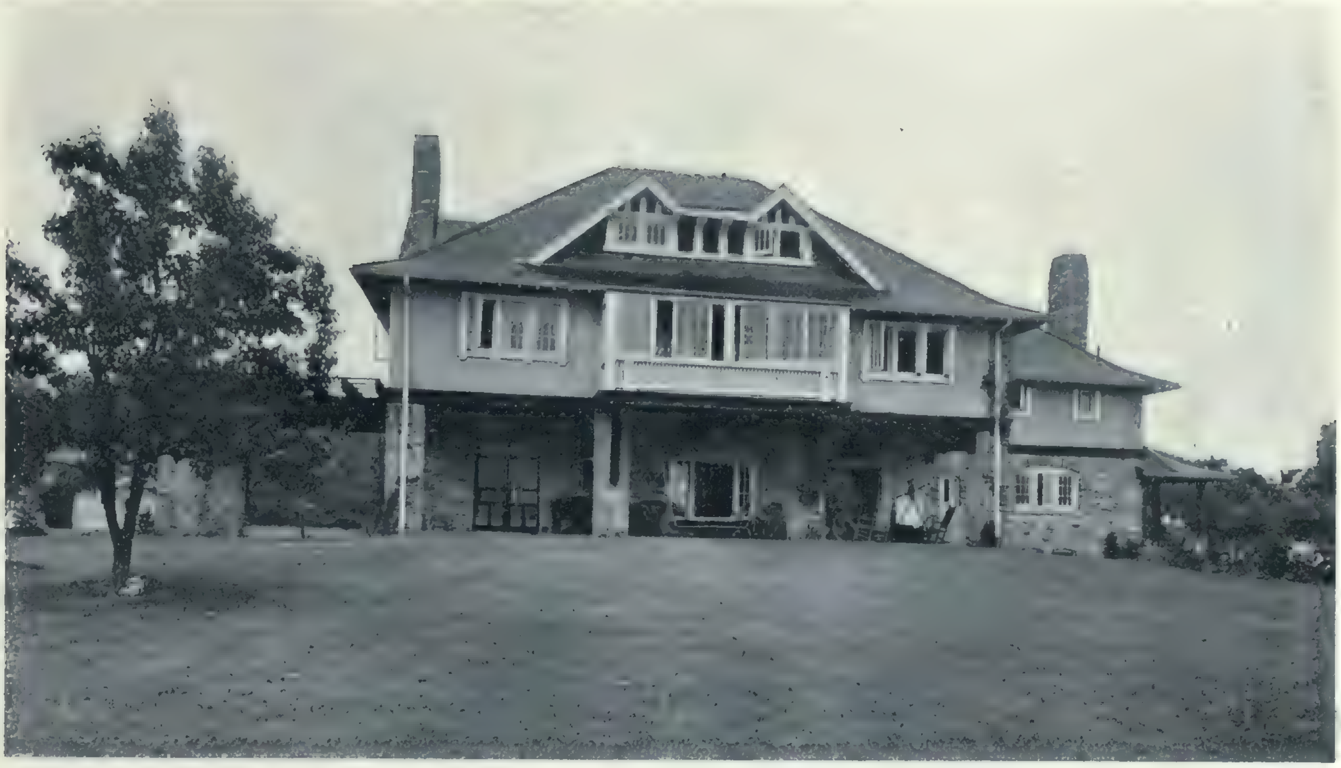
FIRST FLOOR PLAN.

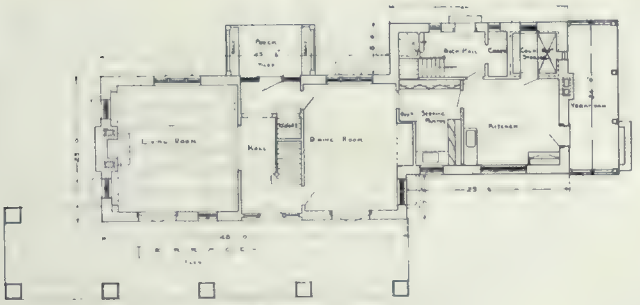
HOUSE NO. I, TORONTO.

H. EDEN SMITH, ARCHITECT.

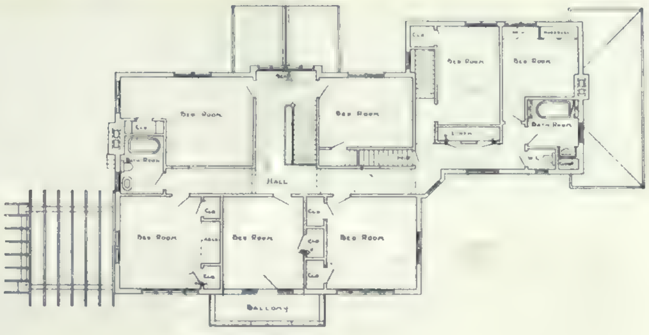


GROUND FLOOR PLAN.





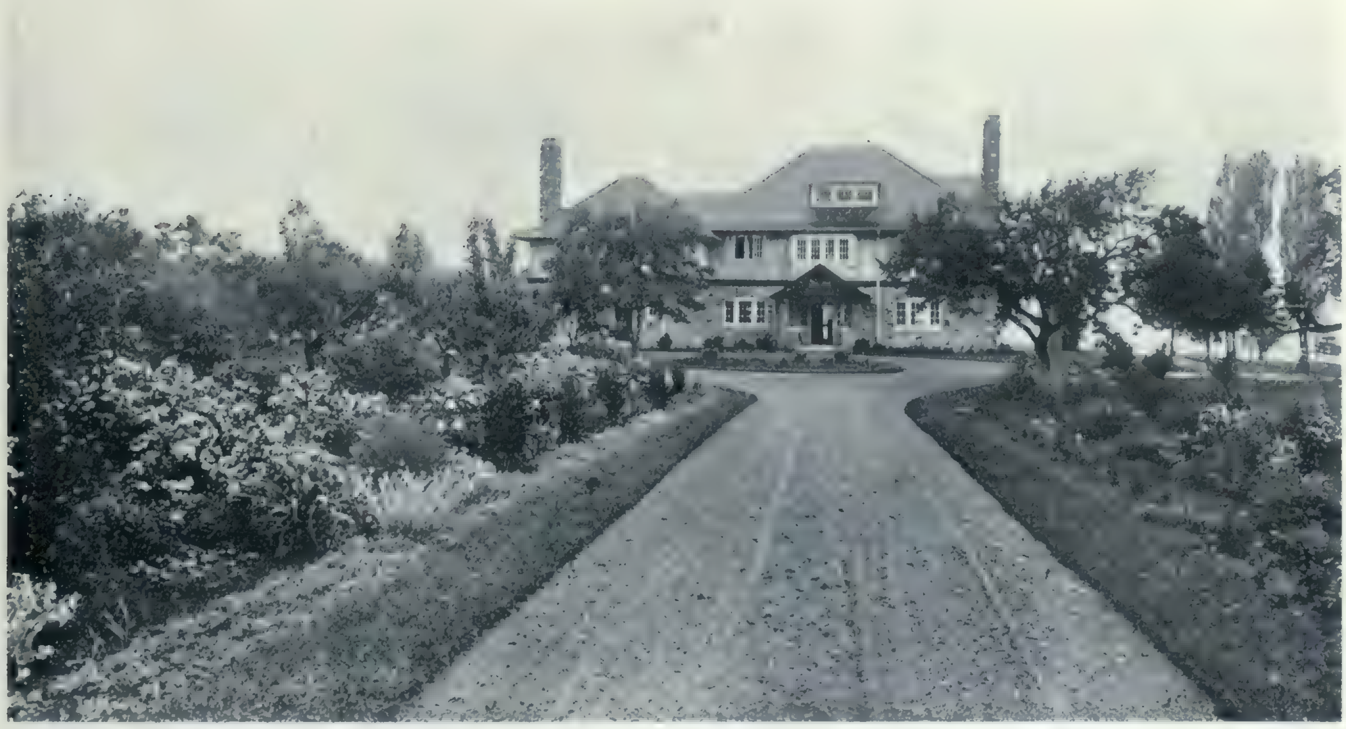
• Ground Floor Plan •

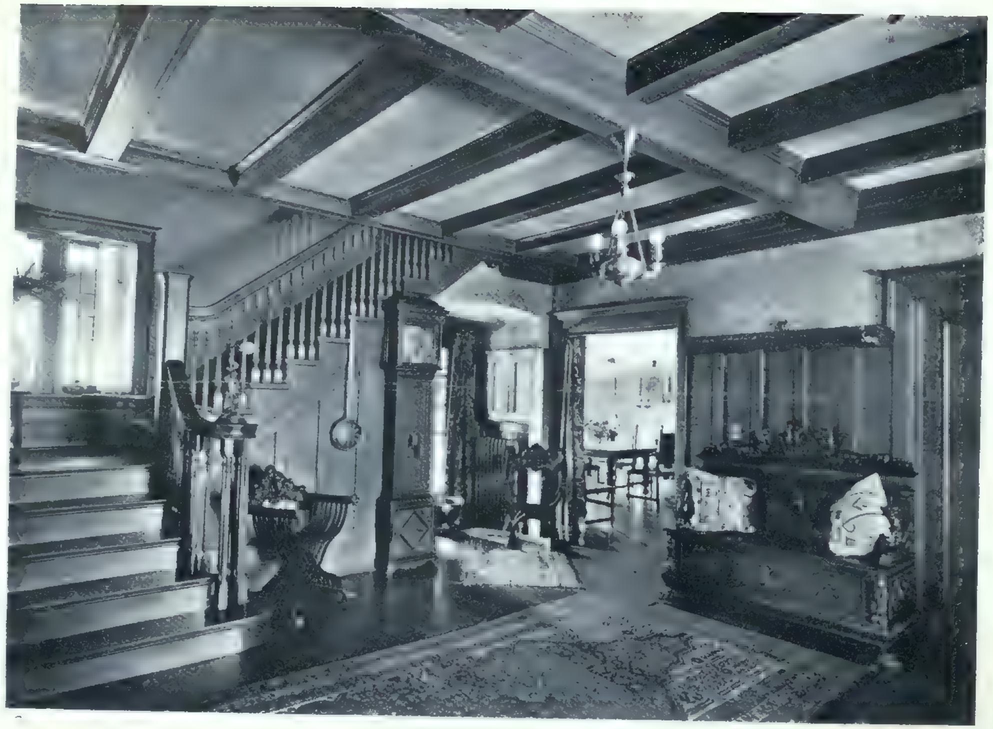


• First Floor Plan •

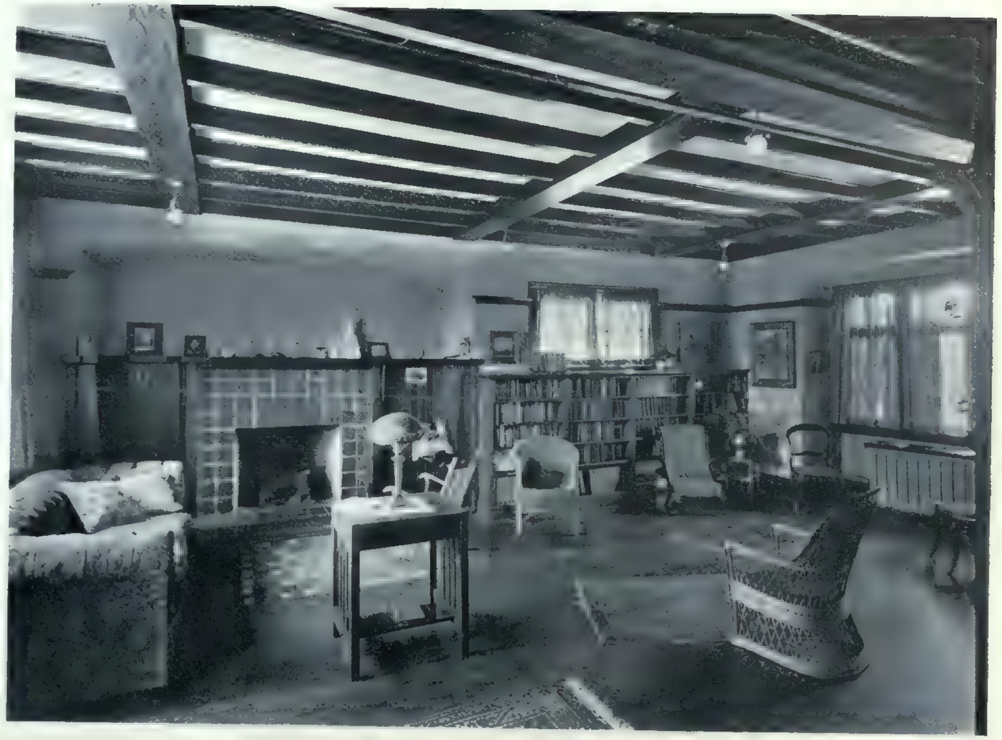
HOUSE NO II, OAKVILLE.

J. FRANCIS BROWN, ARCHITECT.



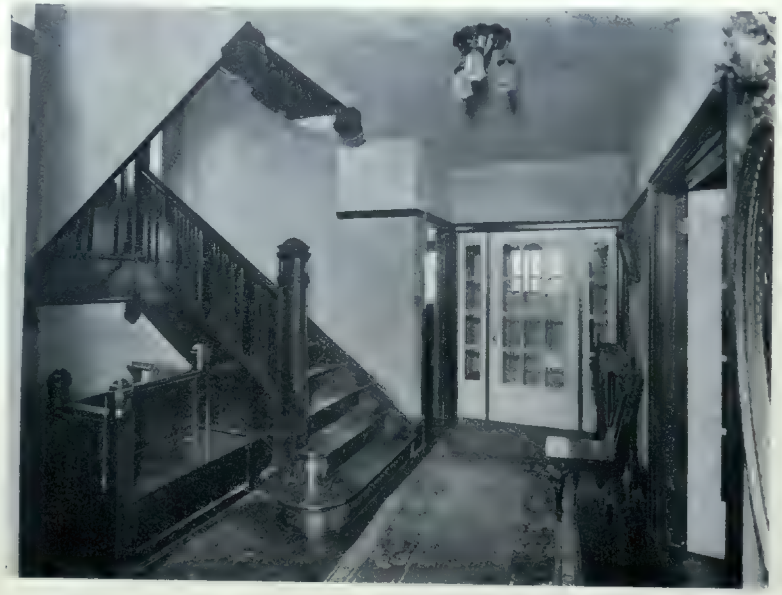


HOUSE NO. VII.
STAIR HALL.

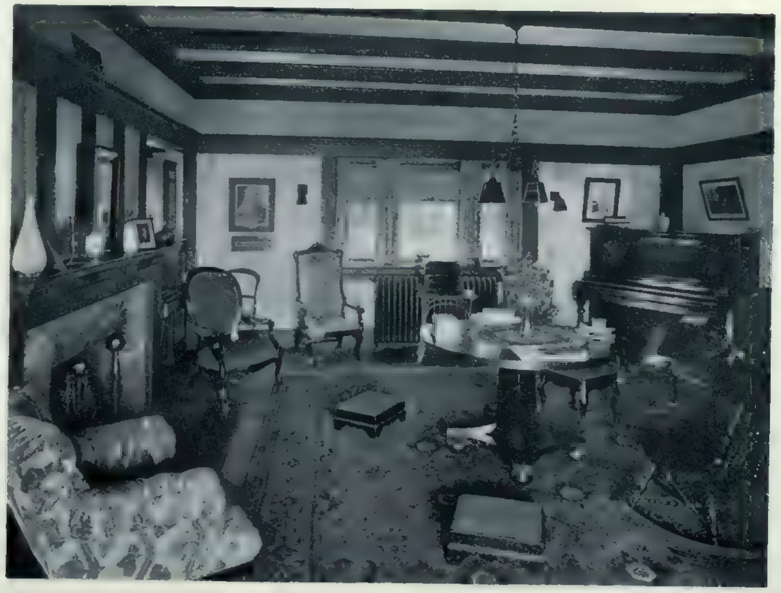


HOUSE NO. IX.
LIVING ROOM.

FOUR INTERIORS OF
HOUSES IN TORONTO.



HOUSE NO. IV.
MAIN HALL.



HOUSE NO. II.
LIVING ROOM.

country house designed on simple lines to the satisfaction of the owner and commanding superb views in all directions. The cost was $10,000.

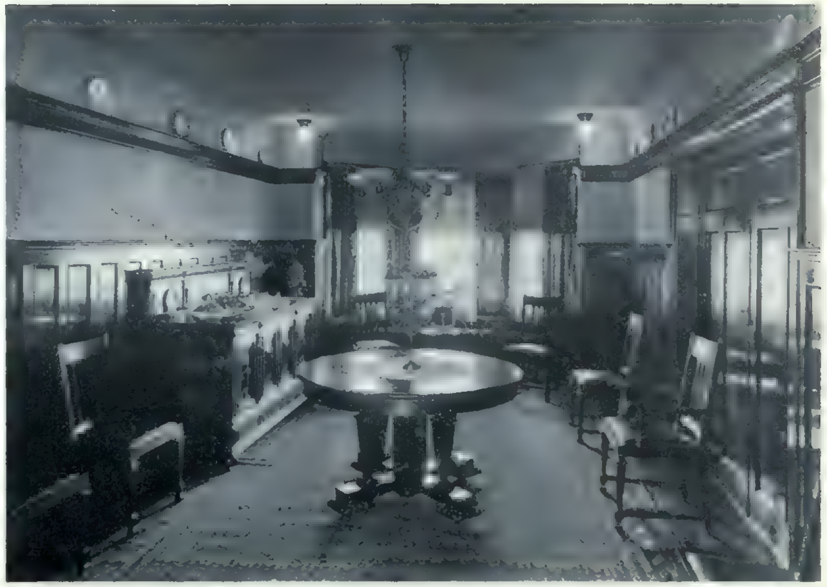
Houses No. III and IV, Oakville; G. N. Molesworth, Architect.—These houses are expressive of the well developed small home with limitations as to area, etc. The first one consists of brick walls to the first story joists, above which are shingles on wooden frame. The woodwork upon the interior consists of Georgia pine trimming, birch flooring on ground floor and pine elsewhere. Equipped with a clothes chute, two fireplaces, cistern for soft water, laundry tubs, hot air furnace, electric light, hot and cold water; the cost was seventeen cents per cubic foot. The second house is designed in brick and stucco, the latter being applied to metal lath on wooden frame. The lower storey has oak flooring and trim, while above is birch flooring and Georgia pine trimming. This house was built for twenty cents per cubic foot and equipped with hot and cold water, two bathrooms, a lavatory, shower in attic, hard water from pump-house at the lake and soft water from cistern, electric lights, and hot water heating.

HOUSE NO. I. LIVING ROOM.

HOUSE NO. V LIVING ROOM.

House No. V, Rusholme Road; F. H. Herbert, Architect.—This problem is quite different from the suburban or country home, where space is not wholly limited. The house stands on a narrow lot with buildings on both sides, which means the working to a definite idea in order to utilize properly every inch of the area. The exterior is of red pressed brick and stone trimmings, the entrance porch having stone columns and pergola roof. Upon the interior the dining-room, stair hall and living-room are finished in quarter-cut oak; the remaining portion having white enamel woodwork and quarter-cut oak flooring. The cost was $12,000.

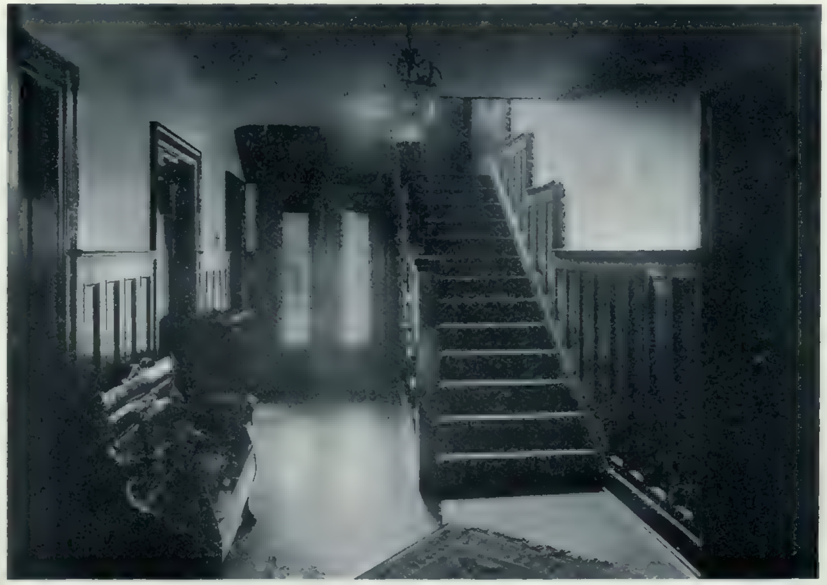
HOUSE NO. VII DRAWING ROOM.



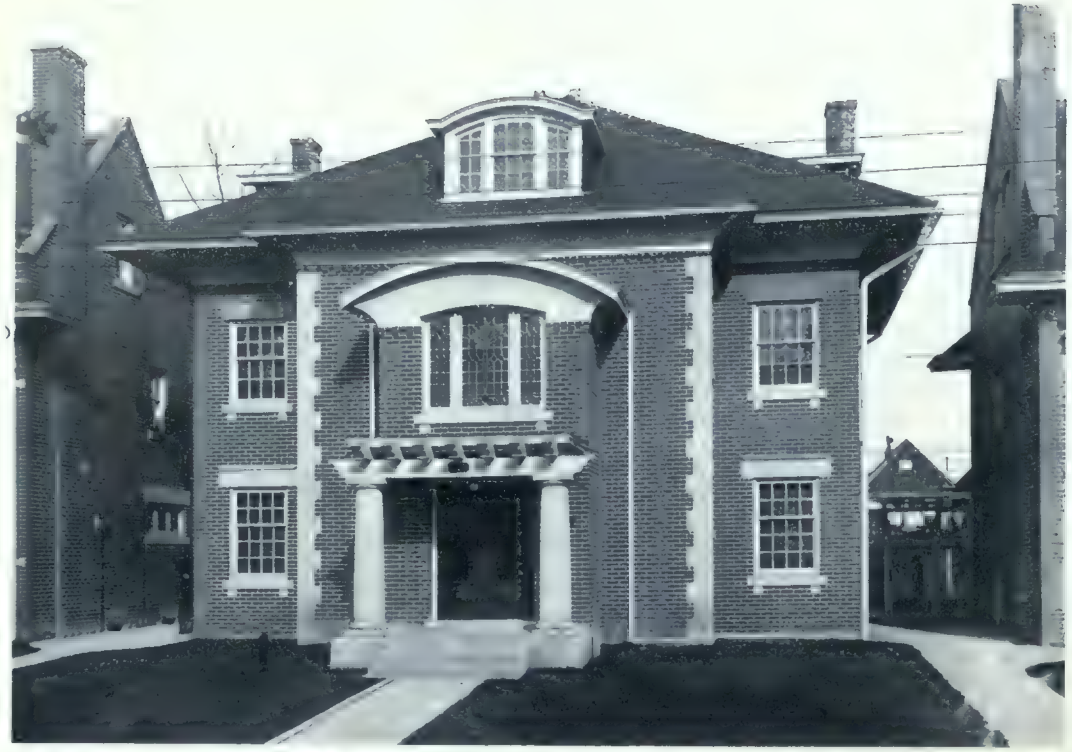
DINING ROOM.

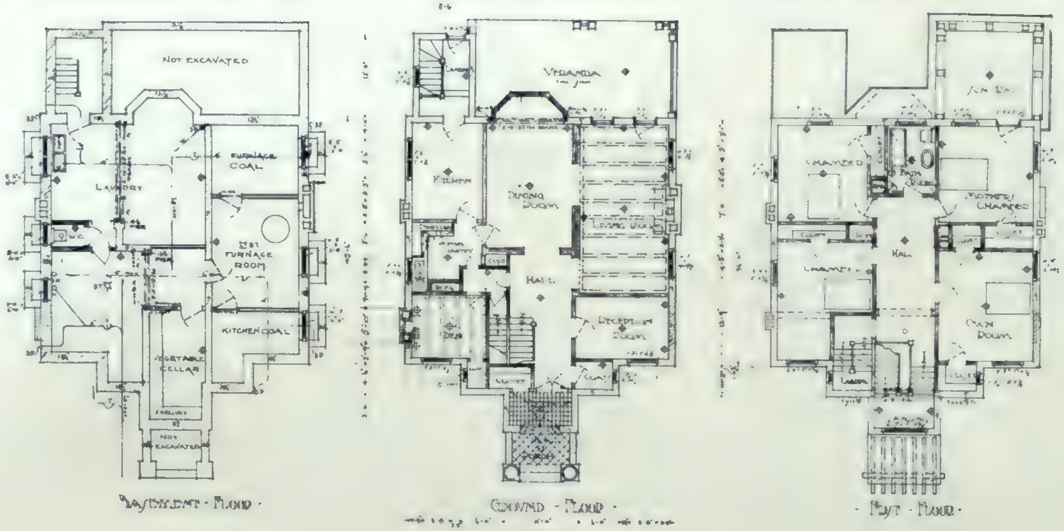
HOUSE NO. V, TORONTO.

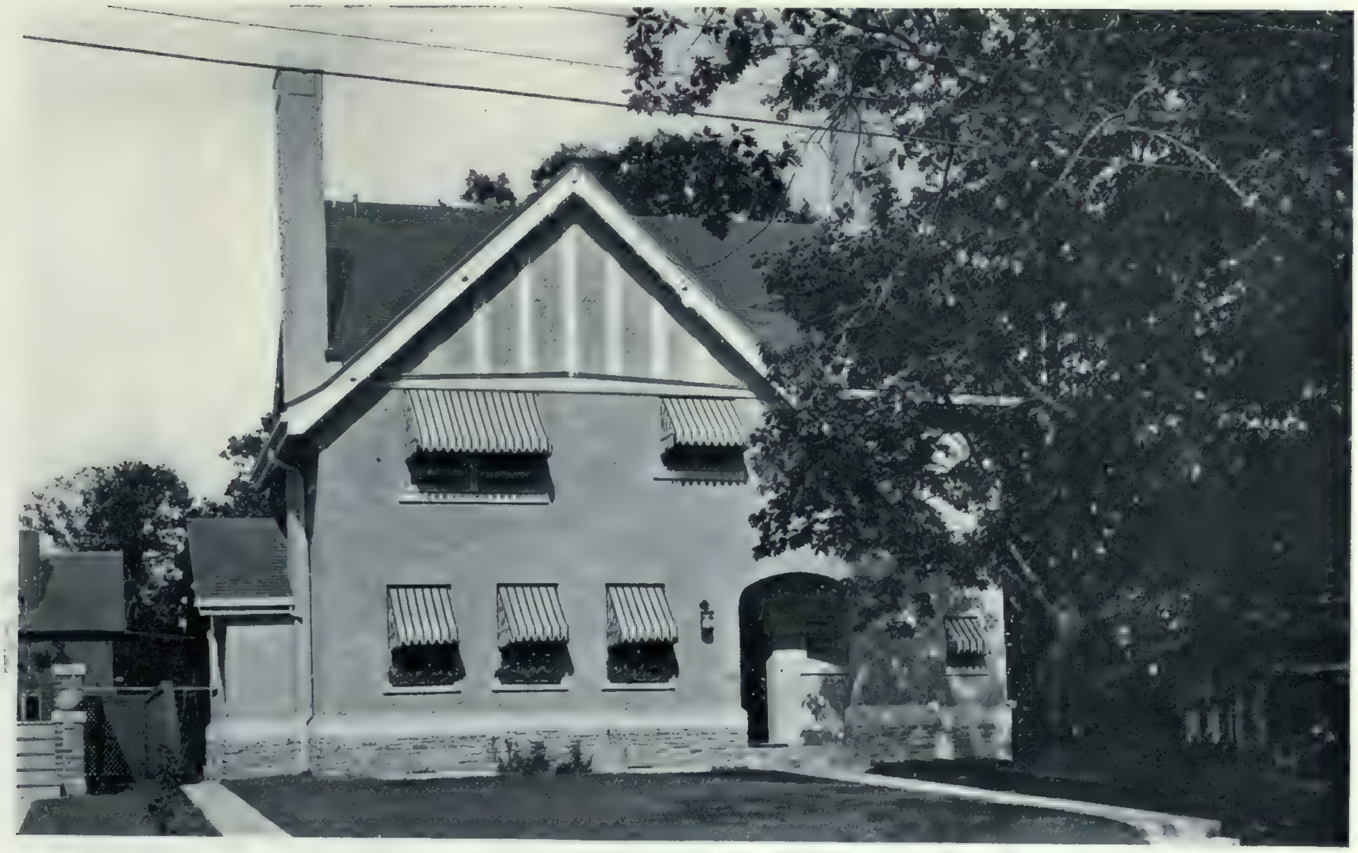
F. H. HERBERT, ARCHITECT.

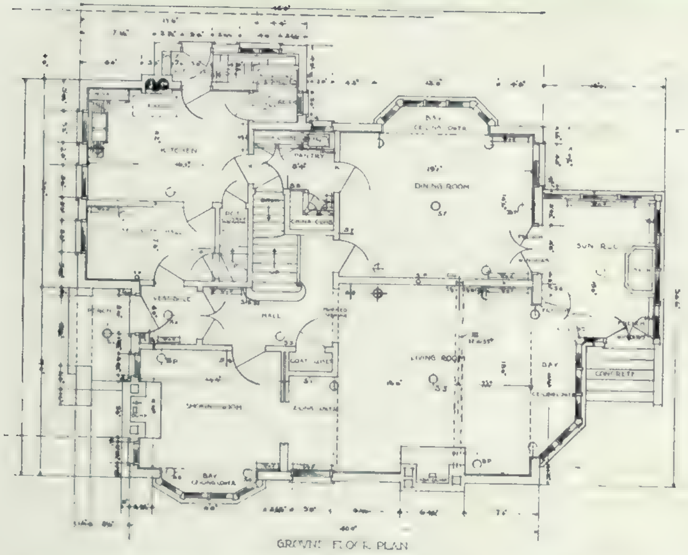


STAIR HALL.

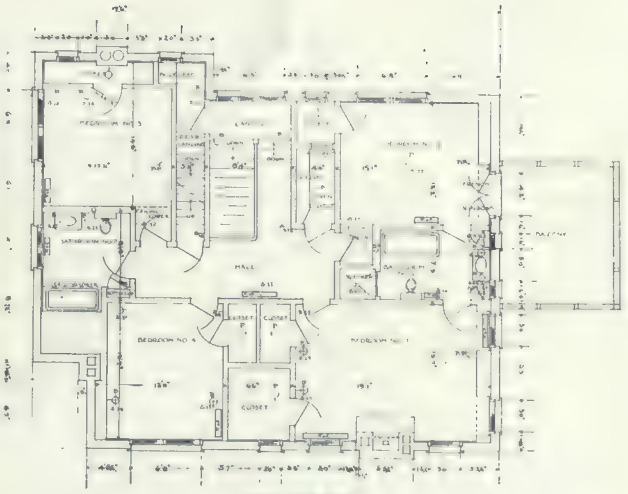




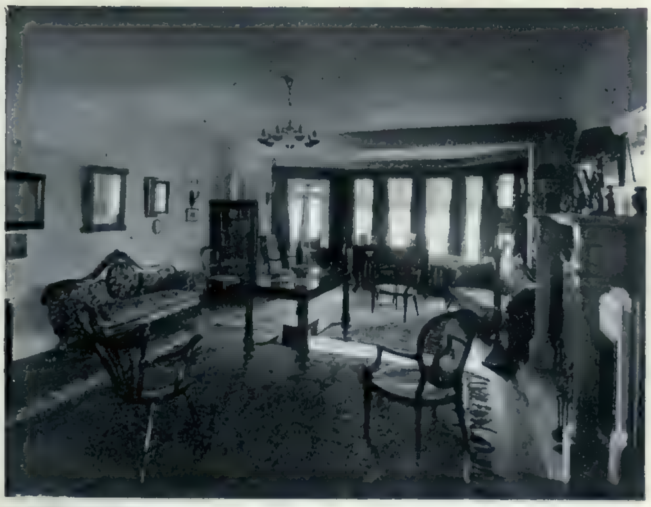




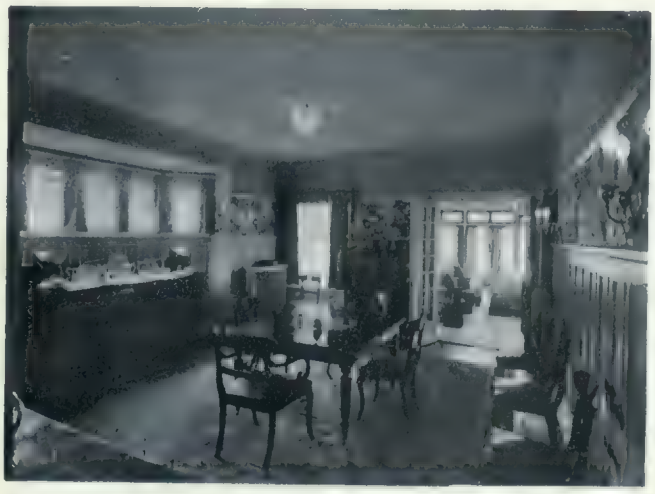
GROUND FLOOR PLAN



FIRST FLOOR PLAN



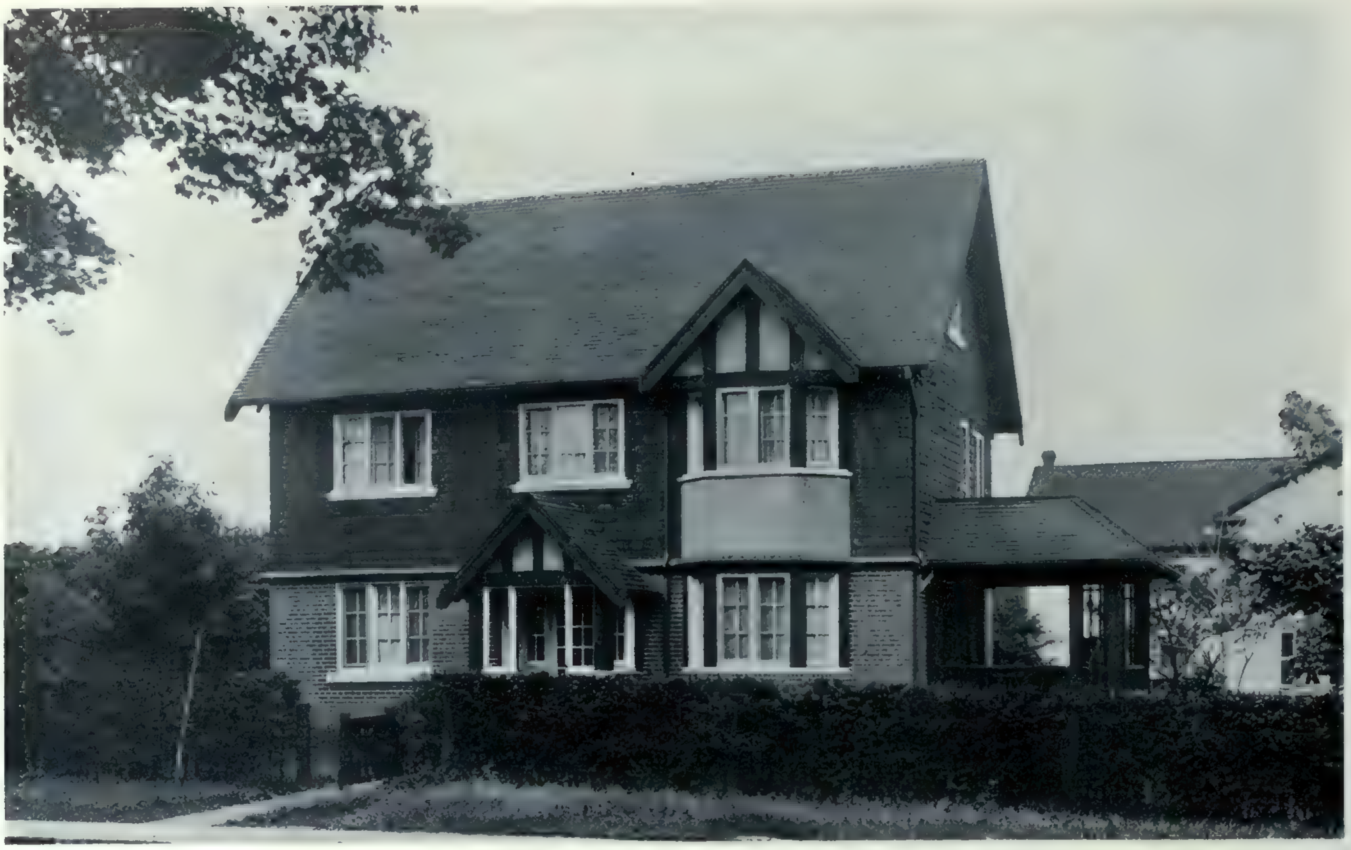
DINING ROOM.

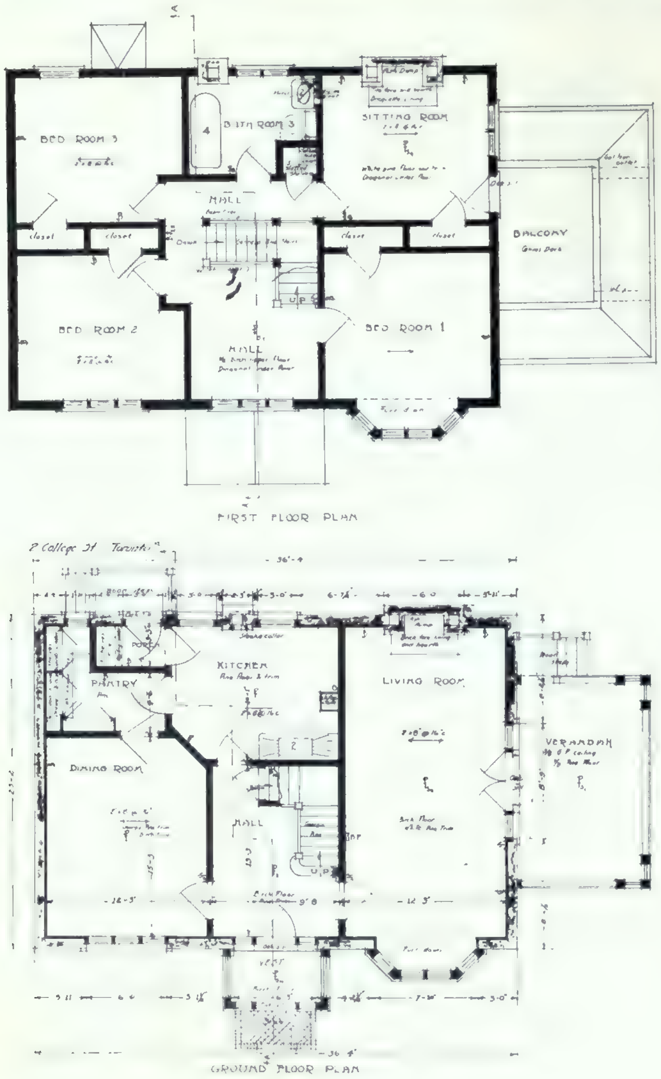


LIVING ROOM.

HOUSE NO VI, TORONTO.

CHADWICK & BECKETT, ARCHITECTS.



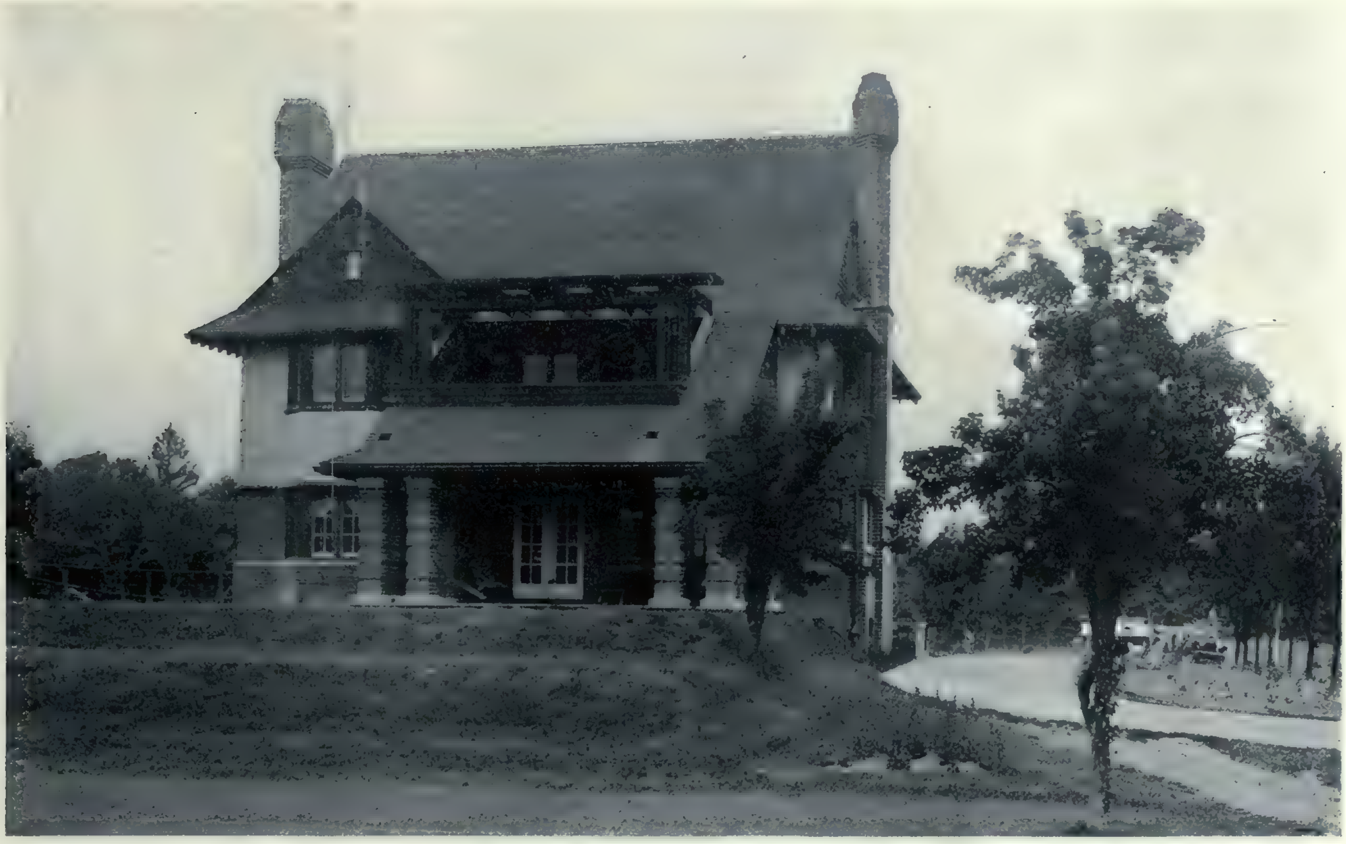


HOUSE NO. III, OAKVILLE.

GEORGE N. MOLESWORTH, ARCHITECT.

House No. VI, Dunvegan Road; Chadwick & Beckett, Architects.—In perfect harmony with the surroundings, this house is built with a base course of flat lake stone, above which a gray stucco is applied to hollow tile, with a shingle roof stained a terra cotta shade. Throughout the first storey the flooring is of oak; the living-room designed in white enamel; the hall and library in oak stained dark; the dining-room in white, wainscot five feet high, above which is a Japanese paper. In the sun-room the floor is of red quarry tile; the large basin for water plants being of the same material with a white cement lining. The cost was approximately twenty-two cents.

House No. VII, Russell Hill Road; E. G. Wilson, Architect.—Situated on a hill with a deep ravine on the south side, the house commands a magnificent view over the lake. A long driveway leading from a rustic stone fence and lined with pine and maple trees brings one to the main entrance of this charming home. The dark red brick, deep gray stucco and reddish brown woodwork all blend into a perfect symmetry with the natural surroundings. The plan has been carefully studied in connection with the site, and the main portion of the ground floor; the reception hall, drawing and dining-rooms all opening upon the verandah with its nine-inch red quarry tile flooring and stucco ceiling. The reception-hall and dining-room are finished in quarter-cut oak with beamed ceilings, the former having solid panels six feet six inches high; the latter open panels. The drawing-room is tastily decorated in white enamel, oak floors and fireplace of best enamelled brick. The basement accommodates a



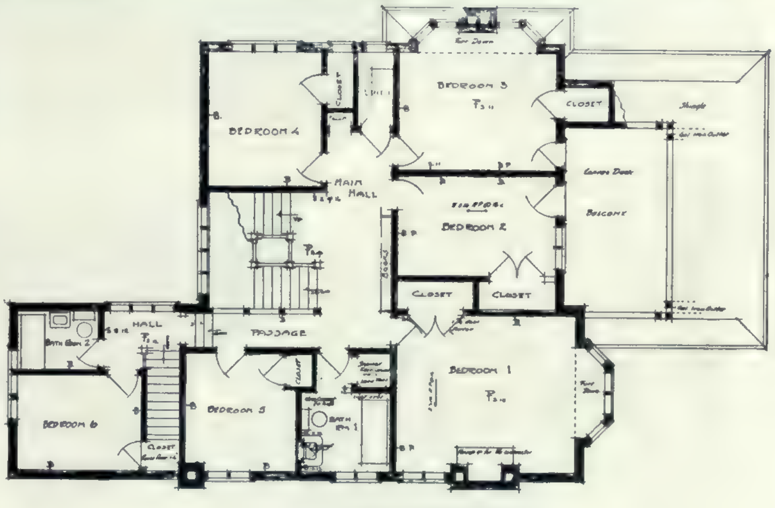
hot water system and a billiard room finished in birch with panels extending to the ceiling and large open fireplace. On the first floor the sitting-room and hall are in quarter-cut oak, with ceilings of a light buff tint. The cost was $19,000.

House No. VIII, Oakville; G .N. Molesworth, Architect.—In this house we have a different solution to the structural part, the stucco and shingles being applied to a wooden frame which brings the cost to fifteen cents per cubic foot. The floors throughout are of birch, the trim of pine. The plan calls for two fireplaces, hot-air furnace, electric lights, hot and cold water.

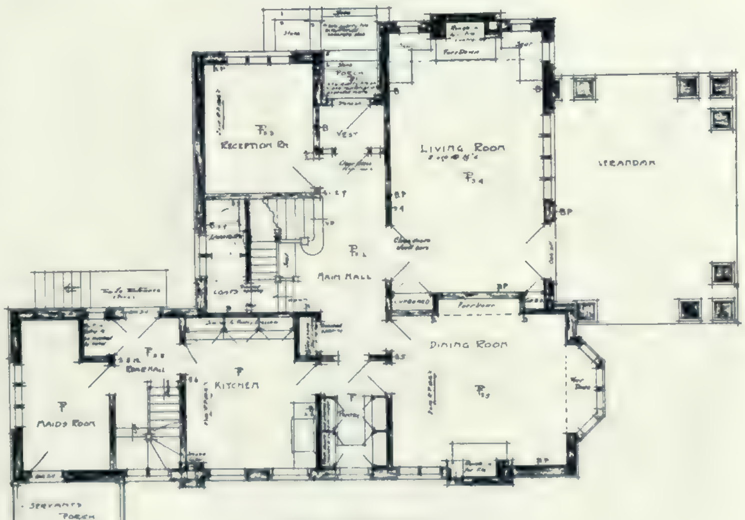
* * *

WHILE it is rarely done in residential work, test borings to determine the nature of the sub-soil should be taken before deciding to build upon a site the character of which is at all doubtful. Even where the general character of the soil in a neighborhood appears to be good, springs and troublesome soft spots may possibly be encountered as well as pockets of quick sand. Below grade, and for a short distance above it, concrete, even where sand and gravel must be hauled from a considerable distance, appears to be the most economical material for a good solid foundation.

Within recent years, chemists have invented various waterproofing compounds for admixture with Portland cement, which are of undoubted merit and which

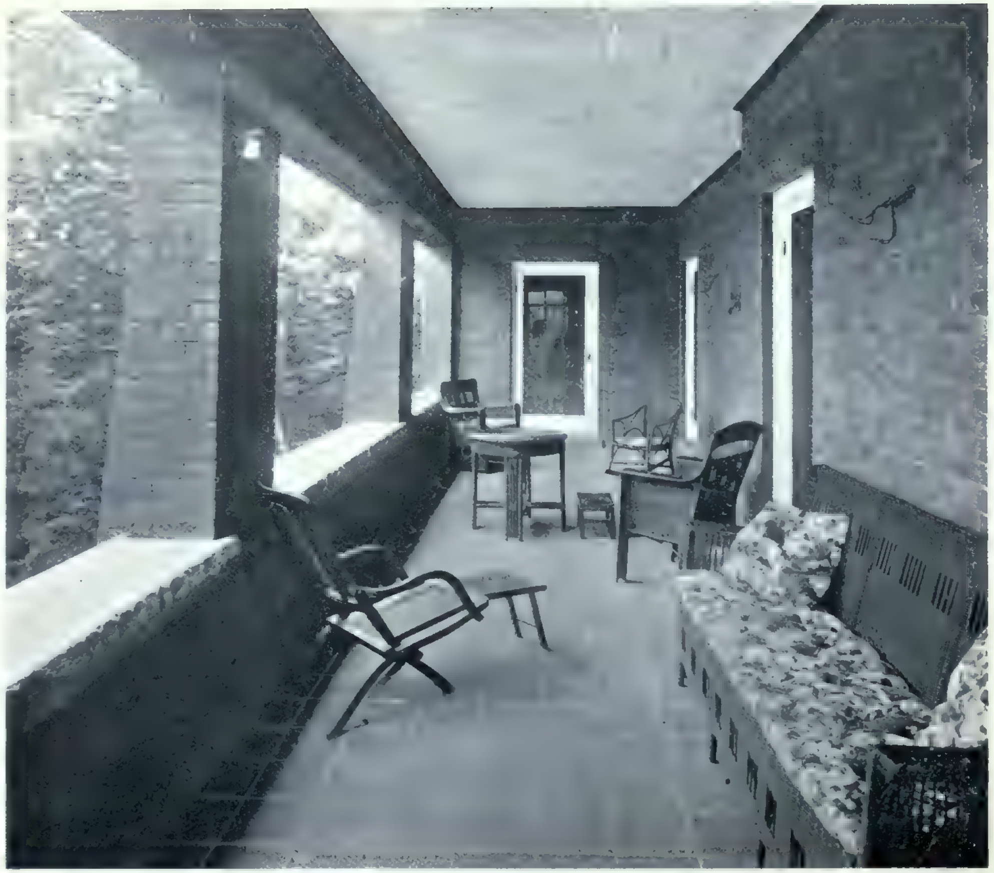


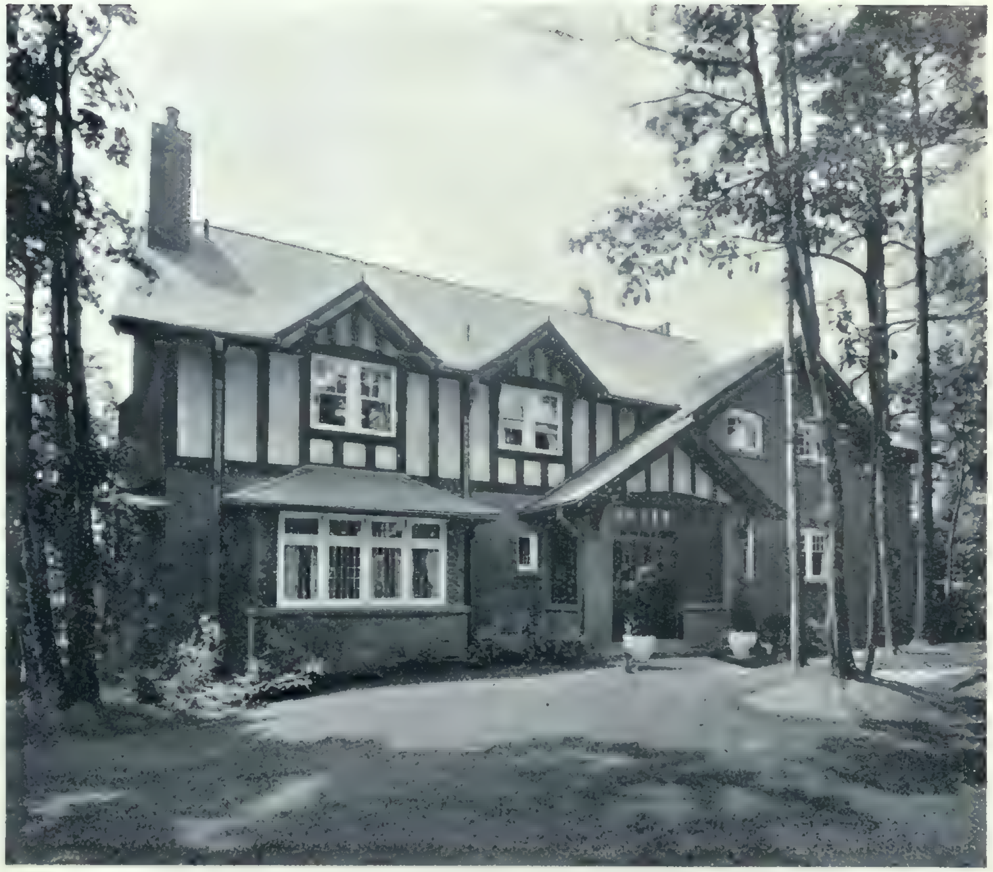
FIRST FLOOR PLAN

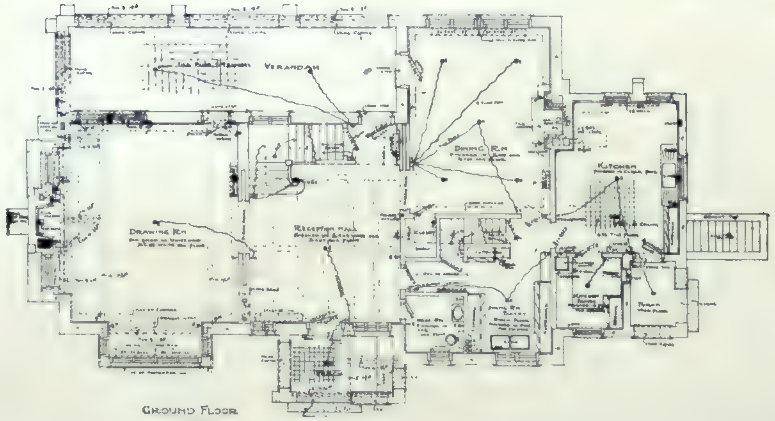


GROUND FLOOR PLAN

HOUSE NO. IV, OAKVILLE.
GEORGE N. MOLESWORTH, ARCHITECT.



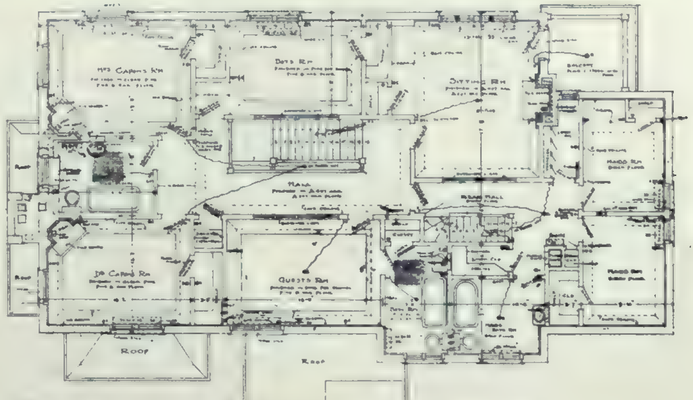




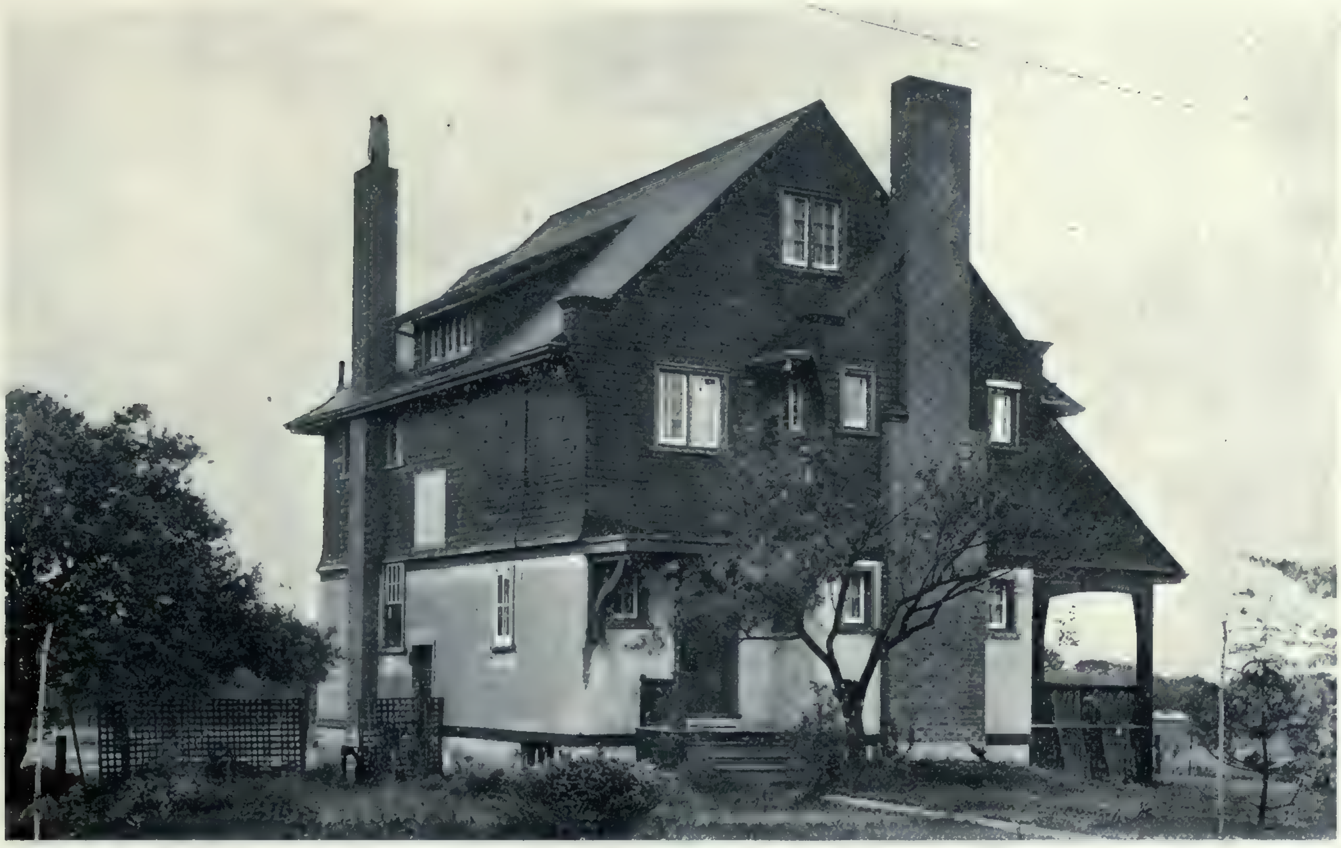
GROUND FLOOR
¼ SCALE

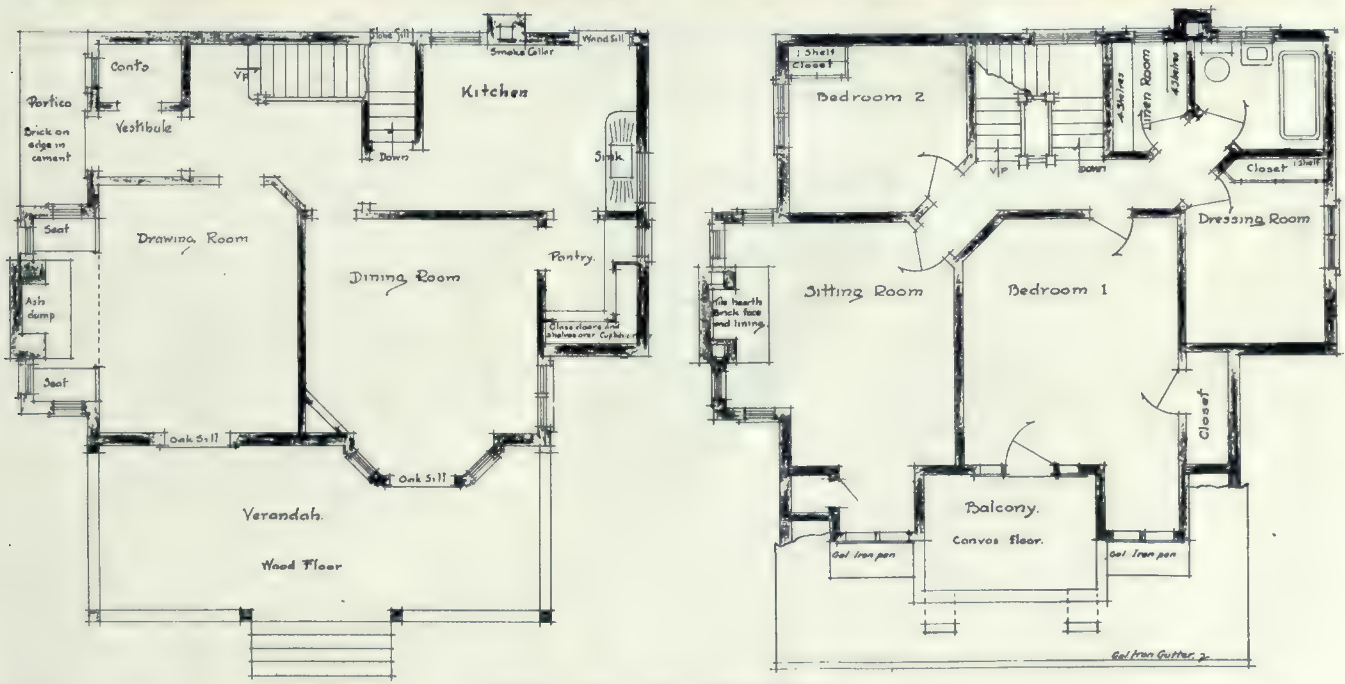
HOUSE NO. VII, TORONTO.

EWART G. WILSON,
ARCHITECT.



FIRST FLOOR
¼ SCALE





GROUND FLOOR.

HOUSE NO. VIII, OAKVILLE.

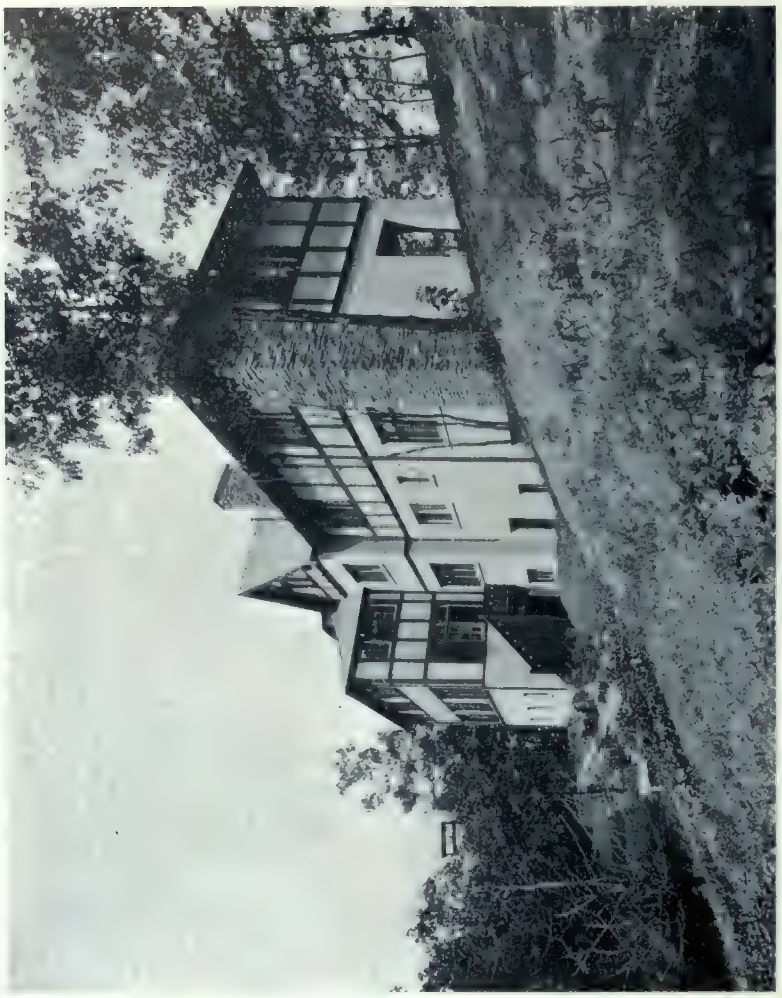
GEORGE N. MOLESWORTH, ARCHITECT.

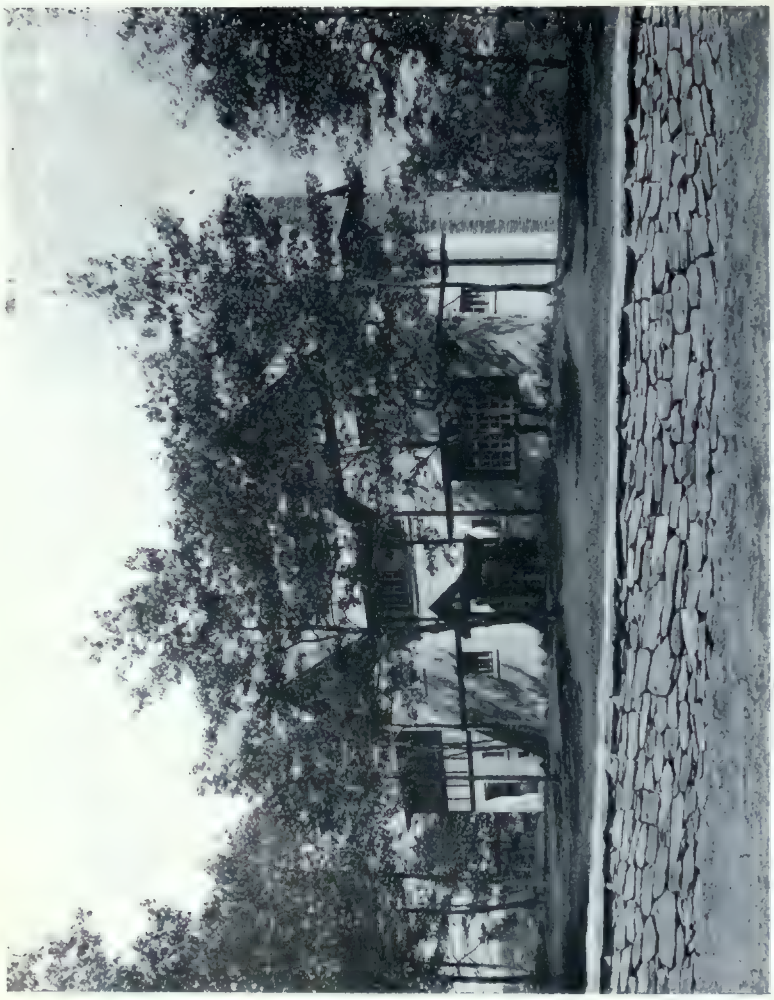
FIRST FLOOR PLAN.

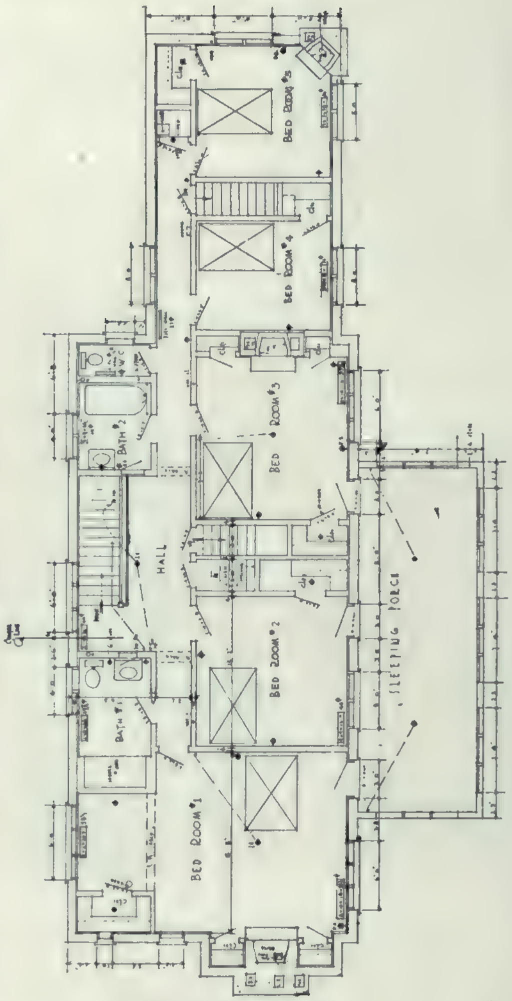
appear to be quite effective in new work. Foundation walls which are thoroughly laid in good rich cement mortar, protected in stiff soils by footing drains and a fill against them of gravel or cinders to allow the surface water to pass quickly to the drain instead of forcing its way into the masonry, should be dry enough when new to suit anyone. As it costs little, however, to incorporate with cement mortar the waterproofing preparations above referred to, it seems well worth while to use them wherever water is to be kept out.

Most houses have outside basement area steps. Great care should be taken that the footings to basement walls adjoining such areas be several feet below the area floor, otherwise the walls above may be lifted by frost sufficient to crack them.

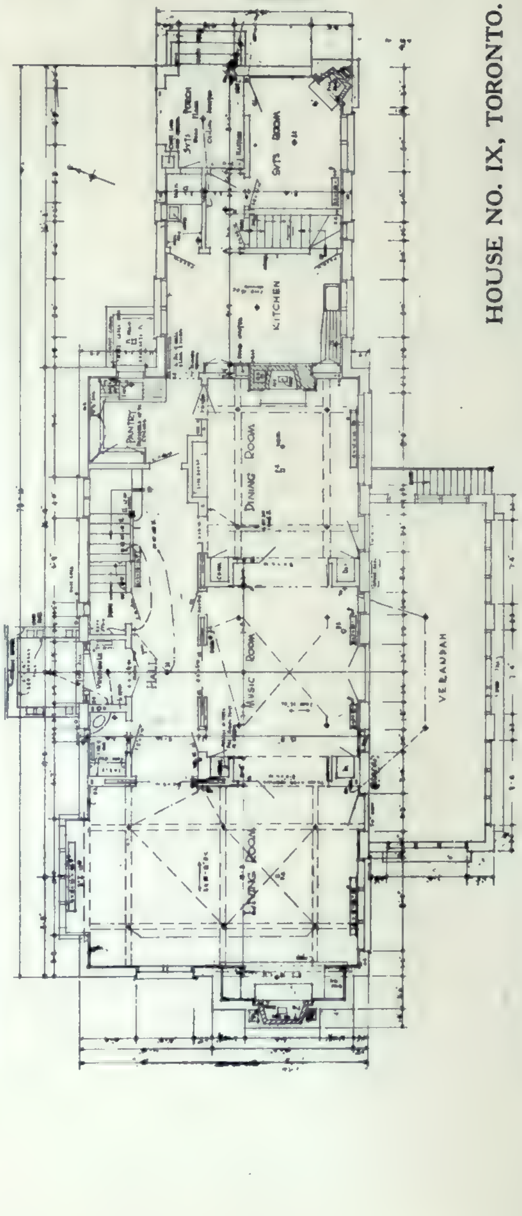
The basement is *not* a good place for a billiard room, except for a house on a hillside, where it can get plenty of sun and air. The summer dampness of the average basement tends to injure the cloth and impair the elasticity of the cushions of the billiard-table.—*R. C. Spencer.*







FIRST FLOOR PLAN.



HOUSE NO. IX, TORONTO.

E. H. YEIGH, ARCHITECT.

GROUND FLOOR PLAN.

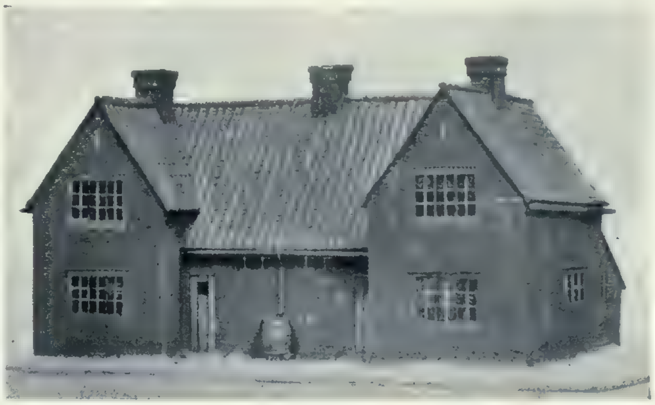
Cottage Designs

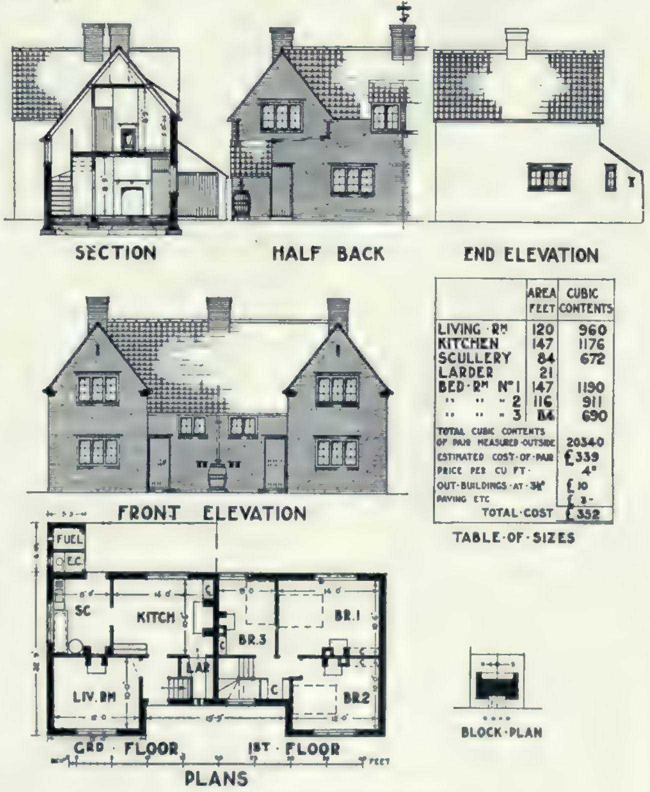
THE following prize designs of the competition held by *Country Life,* London, are presented to our readers as the result of a conscientious effort on the part of nine hundred architects in England to solve the problem of an agricultural laborers' cottage. These designs not only receive a prize of twenty-five guineas, but are to be built, which fact furnishes an additional value to the contest. The following notes and description of the various designs is taken from *Country Life.*

Lawrence Weaver, one of the judges, in commenting on the problem, says:

By way of preface I cannot do better than repeat the words of Lord Curzon of Kedleston, which gave the reasons for the competition being held:

"It would be a national tragedy if, in the building or rebuilding of laborers' cottages that is likely to follow any systematic attempt made by the Legislature to improve the conditions of agricultural life, these old buildings were to be replaced by a new type of standardized cottage, dumped down either singly or—still worse—in rows like a lot of band-boxes, or canisters, or dog kennels, or whatever may be the parallel suggested by the precise degree of monotony and monstrosity presented in their construction. It is doubtful whether the laborer would be more comfortable — he certainly would not be happier—and a cruel injury would be done to the beauty of the countryside. The best way to prevent such a catastrophe seems to me to lie in the preparation of plans, sketches and models of cottages of different materials and styles, suitable to differences of locality, climate and surroundings, which could be erected at moderate prices."





	AREA FEET	CUBIC CONTENTS
LIVING · RM	120	960
KITCHEN	147	1176
SCULLERY	84	672
LARDER	21	
BED · RM Nº 1	147	1190
" " " 2	116	911
" " " 3	84	690
TOTAL CUBIC CONTENTS OF PAIR MEASURED · OUTSIDE		20340
ESTIMATED COST · OF · PAIR		£339
PRICE PER CU FT ·		4ᵈ
OUT · BUILDINGS · AT · 3½ᵈ		£10
PAVING ETC		£3 -
TOTAL · COST		£352

BUCKINGHAMSHIRE TYPE.

ISAAC T. SIFTON.

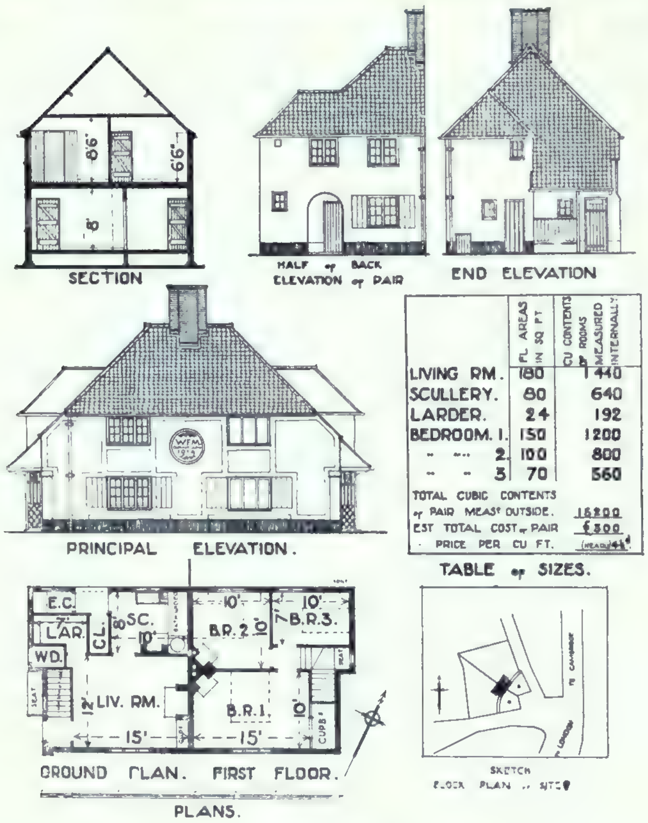
Lord Curzon's suggestion that *Country Life* should undertake this important work has been justified by the results which are now published.

The assessors had to examine the designs set before them for a just combination of three factors of equal importance: (1) Convenience of planning; (2) Seemliness and traditional character in external design; (3) Due regard to limits of cost. It may be admitted that in the case of some of the prize-winning designs the ideal combination of these three factors was not secured, but in most of them there is small occasion for criticism.

Many of those who examine the plans will probably approach the question with a bias in favor of one factor or another. The hygienic enthusiast who cares nothing for artistic qualities will regard them with sole reference to the maximum amounts of floor area and cubic content which have been provided for the minimum sum of money. The artist may complain that some design which shows peculiar grasp of traditional building has been awarded a subsidiary prize, and that the judges have shown favor to a less attractive conception. Some competitors who have labored exceedingly to arrange their plans so that they comply almost exactly with the floor areas, etc., of Schedule I or Schedule II may be disappointed that a design in which those areas, etc., have not been so closely observed has won the first prize. It is unquestionable that some of the first prize types are stronger in plan, others more charming in elevation, and others, again, more ingenious in the adjustment of their cost. The assessors, however, considered the problem presented by each type as a whole, and it is hoped their awards will meet with general acceptance.

In order that readers may appreciate the references to the two schedules of accommodation forming the standards to which the competitors were required to work, they are now reproduced:

	Schedule I. Dimensions recommended as a minimum (from Sec. 17 of Small Holdings Committee Report).		Schedule II. Dimensions to be regarded as the irreducible minimum (from Sec. 157 of Small Holdings Committee Report).	
	Floor Areas.	Cubic Contents.	Floor Areas.	Cubic Contents.
Living-room or kitchen	180	1,440	165	1,320
Scullery	80	640	65	520
Larder or pantry	24	. . . .	18	. . . .
Bedroom No. 1	150	1,200	144	1,152
Bedroom No. 2	100	800	100	800
Bedroom No. 3	65	520	65	520



	FL AREAS IN SQ FT	CU CONTENTS OF ROOMS MEASURED INTERNALLY
LIVING RM.	180	1440
SCULLERY.	80	640
LARDER.	24	192
BEDROOM. 1.	150	1200
– – 2.	100	800
– – 3	70	560
TOTAL CUBIC CONTENTS OF PAIR MEAS^D OUTSIDE.		15800
EST TOTAL COST OF PAIR		£300
PRICE PER CU FT.		(NEARLY) 4½^d

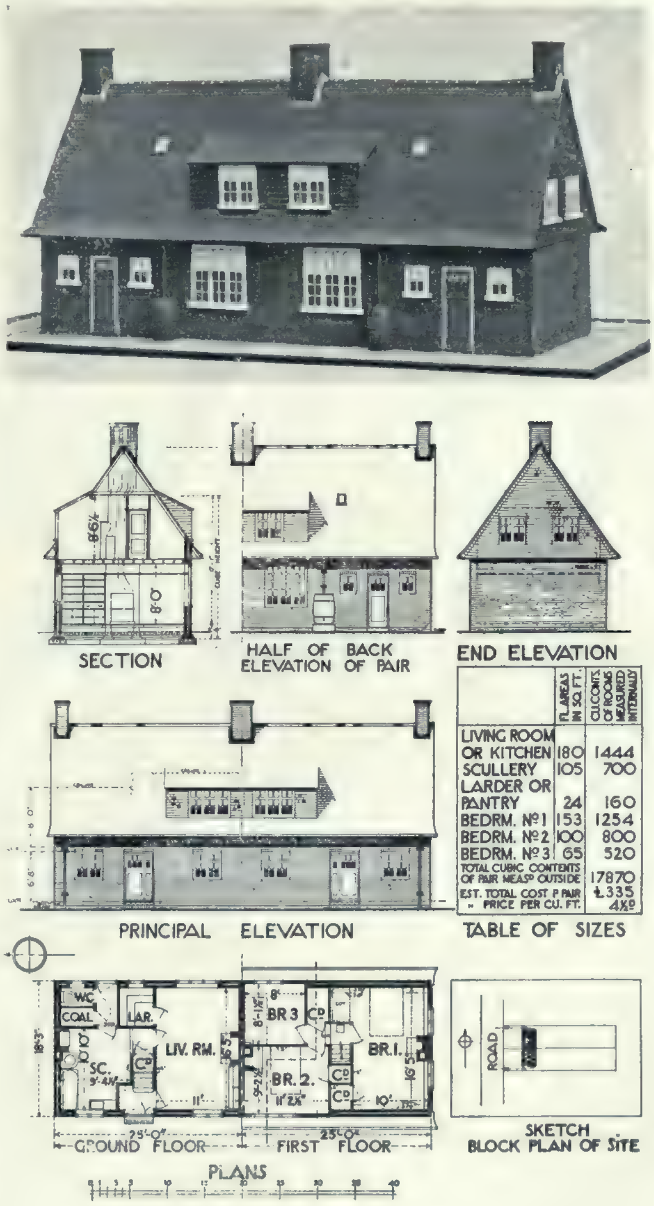
ESSEX TYPE.
HOLLAND W. HOBBISS.

Schedule I represents a good standard for laborers' cottages, below which it is not desirable to go, if cost will allow. Schedule II provides a cottage of small accommodation, and should not be adopted except in localities where a low standard of wages makes it essential that the cost should be kept within the narrowest possible limits.

Buckinghamshire Type.—I. T. Sifton devised a thoroughly practical plan. The parlor opens directly out of the lobby from which the stairs ascend. Both the scullery and larder are entered from the kitchen. This arrangement is very economical of space, and incidentally does away with the necessity for anything in the nature of a back passage. When the housewife is at work at the scullery sink she can see everything going on in the kitchen, and, in particular, has a direct view of the fireplace. This was a point borne steadily in view by the assessors, and with good reason. Children are liable to accidents from playing with the kitchen fire, and it is very necessary to watch them. Another good point is that the main window of the kitchen is in the long side of the room. In oblong rooms this is a more satisfactory arrangement than having the window in the short side of the room, and for the same reason oblong rooms are better than square. The parlors of both cottages face west, which is good. The larders have the same aspect, and this is less satisfactory, but Mr. Sifton has provided that they shall be lighted only by narrow grated openings which are sufficient for ventilation and not big enough to let the sun play havoc with the food. The elevations are simple and reasonable, and there is no dormer except one at the east side roofed with a plain slope and involving little cost. The bedroom plan is thoroughly good, and there is a minimum of unoccupied space in the roof. Mr. Sifton is unduly optimistic in supposing that such a pair of cottages could be built for 8 cents a cubic foot, but as the construction of the cottages is very straightforward, they could doubtless be built for $2,055 at 10 cents. The main point is that, given the accommodation specified, Mr. Sifton has provided a very satisfactory and economical solution of the problem.

Essex Type.—Essex boasts a very definite tradition of cottage building, the most marked feature of which is pargetting. The exterior plastered walls are decorated with a simple panel treatment which is often diversified by rough patterning of zigzags, basketwork, or other simple forms. The first prize design, by Holland W. Hobbiss, with its surface panelling of irregular shapes dictated by the shape of the windows and other features, shows a clear grasp of this tradition, and the panel containing initials and date is an inexpensive bit of decoration, which adds a personal touch to the front. The usual practice in the neighborhood is to treat the bands which enclose the panels in smooth plaster and to finish the enclosed surfaces in a rougher fashion. The majority of competitors of this type do not seem to have appreciated the note in the conditions that the effect of the cottages with reference to the surroundings should be borne in mind. The site is a corner one at the junction of two narrow ways set back a little to the west from the main road which runs through Newport from London to Cambridge. It should have been obvious that the first consideration was the placing of the building so that it presented a pleasing aspect from the main road. This meant setting it across the corner of the site, whereas many of the designs showed it facing due south and presenting a narrow and often ugly end elevation to the high road. Mr. Hobbiss grasped the situation correctly. The plan is admirable, with the stairs rising from the front lobby and the scullery and larder opening direct from the living-room. The E.C. is under the main roof, but divided by an open lobby from the scullery door. The bedroom plan is good, and there is only a single chimney stack. Essex is unhappily one of the counties in which laborers' wages are at a deplorably low level, and it was wisely felt that the competitors should get as near the ideal figure of $1,458 for the two as a due regard for proper accommodation would allow. At $1,458 the pair the cubic foot price would be 9 cents, a figure difficult enough to keep to, if not impossible, but there seems to be no reason why there should be any considerable extra over $1,458, given care in drafting the specification, etc. It is not generally realized how very important a factor in the cost of cottages this may be, and how terrified small country builders are of giving a tender on a "bill of quantities" for small work such as cottages. This method is normal in town building, and contractors who do town work know what it means. Country builders, however, confronted with the formidable document setting out with full technical descriptions the details of the work will sometimes quote as much as 40 per cent. more for some unimportant piece of work than they would do if they only had a drawing and a short specification before them.

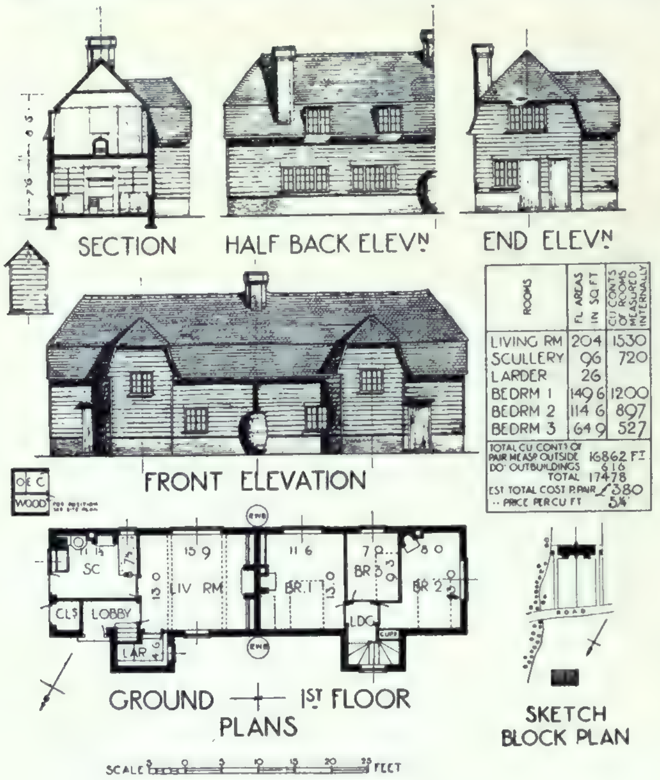
Hertfordshire Type.—The winners of the first prize, Messrs. A. and J. Soutar, have had large experience of cottage building and other manifestations of garden suburb activity. They won the first prize in the recent town-planning competition for Northwood and Ruislip. Their conception of a Hertfordshire type is thoroughly simple and effective. There are simple sloping dormers on both fronts, and ample window space in the tile-hung gable ends. Many competitors in respect of various types wasted money by providing dormer windows in the roofs when they had designed blank gable ends which it would be much cheaper to pierce with plain windows, as in this case. Messrs. Soutar adopted what may be called the "through" principle for their living-room plan, lighting it both from the east and the west, and put the scullery at the ends. The position of the scullery sink is not ideal with respect to the living-room, and the scullery itself has a floor of rather larger area than necessary. Schedule I provides for 80 square feet, whereas Messrs. Soutar have given 105 square feet. The total area of the ground floor rooms could not have been less to allow the three bedrooms upstairs, but it would have been better if more space had been given to the living-room and less to the scullery. The bedroom plan is particularly admirable by reason of the provision of a large cupboard in each bedroom. There are three chimney stacks to the pair of cottages, so placed as to allow the provision of a fireplace in the third bedroom, if it were desired. Particular attention may be



	FL. AREAS IN SQ. FT.	CU. CONTS. OF ROOMS MEASURED INTERNALLY
LIVING ROOM OR KITCHEN	180	1444
SCULLERY	105	700
LARDER OR PANTRY	24	160
BEDRM. Nº 1	153	1254
BEDRM. Nº 2	100	800
BEDRM. Nº 3	65	520
TOTAL CUBIC CONTENTS OF PAIR MEASᴰ OUTSIDE		17870
EST. TOTAL COST P PAIR		£335
" PRICE PER CU. FT.		4½ᴰ

HERTFORDSHIRE TYPE.

A. & J. SOUTAR.



ROOMS	FL AREAS IN SQ FT	CU CONTS OF ROOMS MEASURED INTERNALLY
LIVING RM	204	1530
SCULLERY	96	720
LARDER	26	
BEDRM 1	149 6	1200
BEDRM 2	114 6	897
BEDRM 3	64 9	527

TOTAL CU CONTS OF PAIR MEASD OUTSIDE	16862 FT
DO OUTBUILDINGS	616
TOTAL	17478
EST TOTAL COST P. PAIR	£380
·· PRICE PER CU FT	5¼

KENT TYPE.

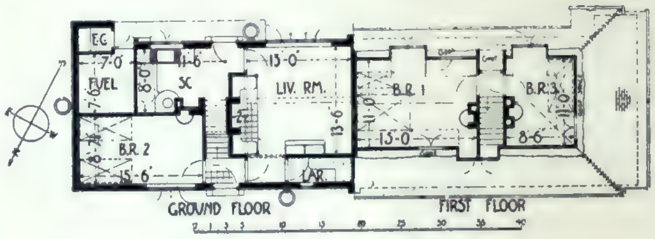
A. W. HARVEY AND H. G. WICKS.

drawn to the convenient placing of the cot in the largest bedroom.

Kent Type.—The entry for this type was naturally large. The price for the pair, namely, $1,860, was not unduly restricted, and the provision that elm weather-boarding should be used in the Kentish manner gave artistic possibilities which attracted some of the best talent brought to bear on the competition. The number of admirable designs (out of a total of 130) was so large that the assessors would have had great difficulty in awarding the first prize simply on the grounds of artistic merit. Planning and economical accommodation, as evidenced by low cubic capacity, played, therefore, a large part. W. Alexander Harvey and his partner, Graham Wicks, secured an amount of accommodation somewhat in excess of Schedule I and yet kept their total cubic capacity within 17,500 ft. A good many of the competitors do not seem to have recognized the somewhat unusual character of the site. The road front of the cottages faces north. In order, therefore, to secure a southern aspect for the living-room, many of the competitors very wisely planned it of "through" type with windows in both sides.

The planning of the first prize design provides for a very comfortable living-room with scullery and larder opening from it, and with their doors immediately adjoining the entrance door from the lobby. This means that the living-room has the greatest possible area of unimpeded space, none of which is prejudiced by being used as a passage way. The scullery, on the other hand, is enough of a passage way to prevent it being used as a living-room, a point to which great importance is rightly attached. The staircase is cleverly arranged over the larder. The coals are provided for in a space immediately adjoining the scullery, and the E.C. and wood shed are entirely detached and placed to the side of the main block. The bedrooms are of good size and conveniently shaped. Two of them have southern aspects, and the third faces east or west. Owing to the employment of a mansard roof the walls are carried up only to the sill level of the bedroom windows, and it is not unreasonable, therefore, to assume that the building can be carried out for within ten per cent. of the estimated cost.

There is no doubt that the ideal arrangement for a living-room fireplace is in a wall which is not pierced by doors on either side of the fire. People want to sit round their fires without being disturbed by an opening door or by the devastating drafts which are likely to blow even when the door is closed. As illustrating the importance of a right position for a fireplace, Aylwin Cave's design (for the model of which he was awarded a book prize) is now reproduced. He has thoroughly captured the spirit of the Kent cottage in his elevations, but the plan leaves a good deal to be desired. The fireplace is in a shallow ingle-nook placed between the living

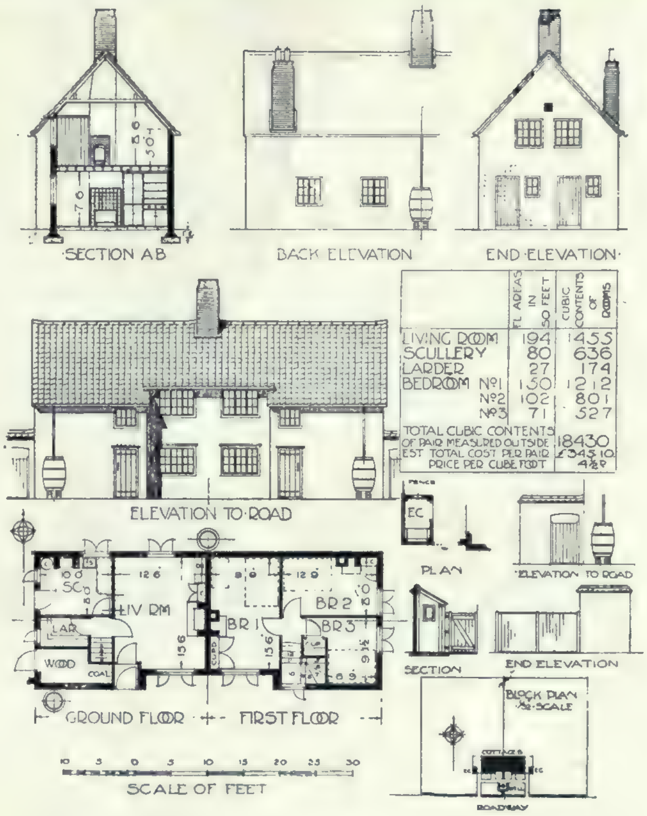


KENT TYPE, BOOK PRIZE.

AYLWIN CAVE.

room doors to the front lobby and to the scullery. No doubt the ingle-nook helps to modify the objection of this arrangement, but it does not do away with it altogether, and ingle-nooks are rather *vieux jeu.* Mr. Cave places one of his bedrooms on the ground floor, but, in spite of this disadvantage, he does not succeed in reducing his total cubic capacity below 20,224 cubic feet. The especial objection to a downstairs bedroom is that the temptation to the cottager to use it as a parlor, and to crowd his whole family into the two upstairs bedrooms, is rarely resisted. A well known landowner who has given particular attention to rural housing on his estates recently made a census of the habits of twenty-five families living in cottages with a downstairs bedroom. In only four cases did he find that this room was used as a bedroom. In one the occupant was a cripple who was unable to get upstairs; in a second there was a parlor in addition to the bedroom; in only two, therefore, out of twenty-three did the family use the accommodation provided in the way it was intended. Another landowner with whom the writer was recently discussing this point was on the side of the downstairs bedroom, on the ground that there is often a bed-ridden person who cannot get upstairs, and would be cut off from family life if there were no ground floor bedroom. It is not reasonable, however, to regard this as normal, or to defend the downstairs bedroom merely because it serves the needs of an occasional cripple or a bed-ridden granny.

Suffolk Type.—The plan by C. I. Kay, to which the first prize was awarded, differs from many of the others, in that the staircase rises in the middle of the cottage from a little lobby which connects the living-room, scullery and larder. This arrangement has the objection that there are two doors between the living-room and scullery, but there is the corresponding advantage that the living-room has only two doors (one from the outer lobby and one from this internal lobby), and its allowance of 194 square feet is all unimpeded space in consequence. It is, perhaps, the most comfortable living-room in any of the prize designs, and is lighted both from the north and the south. The scullery is, in part, a passage-room which, at the risk of being tedious, I once more say is a very good point. Anything which compels the family to use the scullery simply for washing up, etc., and to get the full value out of a really comfortable living-room is to be regarded as a good point in planning. The bedrooms upstairs are comfortable and well provided with cupboards. The simple roof treatment without dormers is thoroughly typical of Suffolk and cannot fail to look very well with the plain whitewashed walls. The cottages should be very warm because each has only two windows to the north, all the rest of them facing south, east and west. For all its simplicity, this design shows considerable skill, and the break-back of the middle part of the south front not only much simplifies fenestration by doing away with dormers, but gives a touch of interest to the modelling of the cottage. The total cubic content of the cottages is 18,430 cubic feet, which represents $1,680 at 9c. per cubic foot.

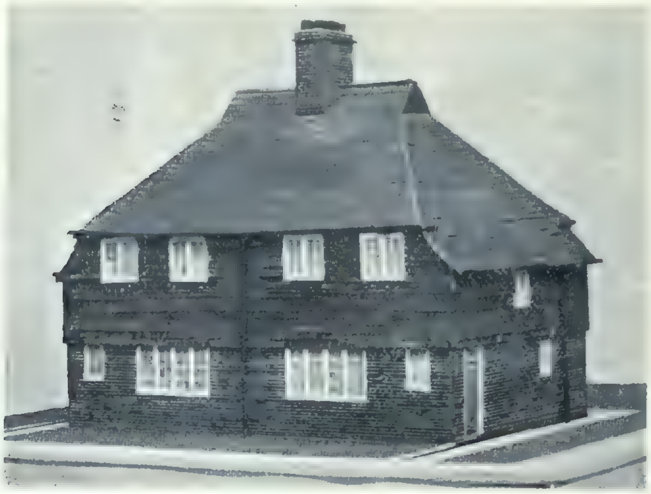


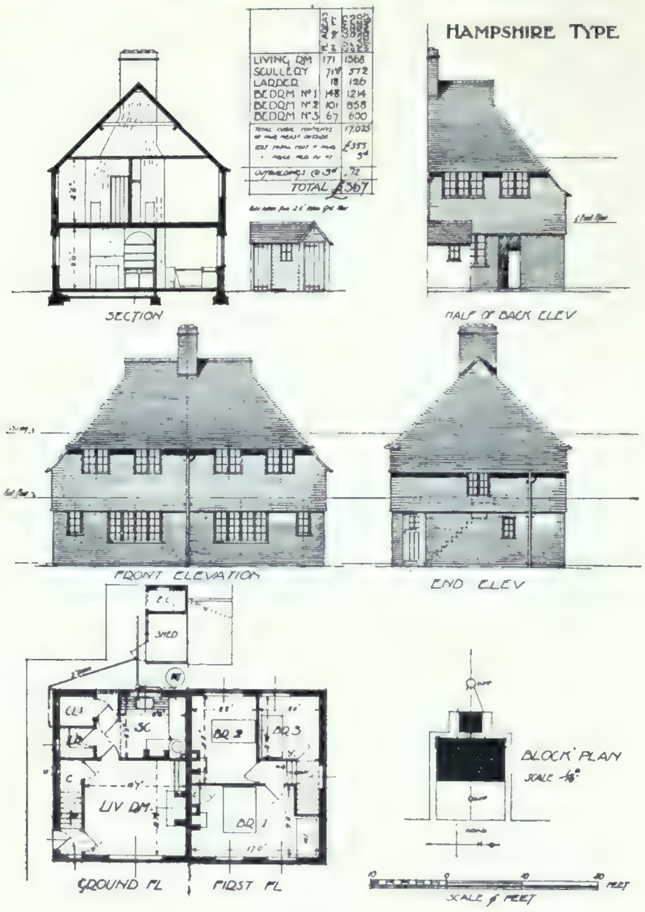
	FL AREAS IN SQ FEET	CUBIC CONTENTS OF ROOMS
LIVING ROOM	194	1455
SCULLERY	80	636
LARDER	27	174
BEDROOM Nº1	150	1212
Nº2	102	801
Nº3	71	527
TOTAL CUBIC CONTENTS OF PAIR MEASURED OUTSIDE		18430
EST TOTAL COST PER PAIR		£345 10
PRICE PER CUBE FOOT		4½d

SUFFOLK TYPE.

C. I. KAY.

Hampshire Type.—This pair was to accord with Schedule II., which may be regarded as the minimum of decency in the accommodation of a laborer's cottage. The first prize design, by C. Edmund Mee, shows an attractive and straightforward solution of the problem. The walls of the ground storey are of red brick, and the first floor is tile hung. The hipped ends with gablets are thoroughly in the Hampshire tradition. The plan is of the type seen in several others of the first prize designs, *e.g.*, Essex, Montgomery, Yorkshire West Riding and Northumberland. The scullery is placed behind the living-room. The arrangement of the door between the two rooms is not perhaps quite so good as in the Northumberland type, which it most closely resembles, as a little lobby space is provided which is not really necessary. In accordance with the by-law, the E.C. is 10 ft. from the main block, and a good shed has been attached to it which will serve for wood, tools, etc. The bedroom plan is excellent, and a single chimney stack serves both cottages. The total cubic content is only a trifle over 17,000 ft., and there seems no reason why the pair should not be built at 10c. per cubic foot, making the total, including outbuildings, $1,780.

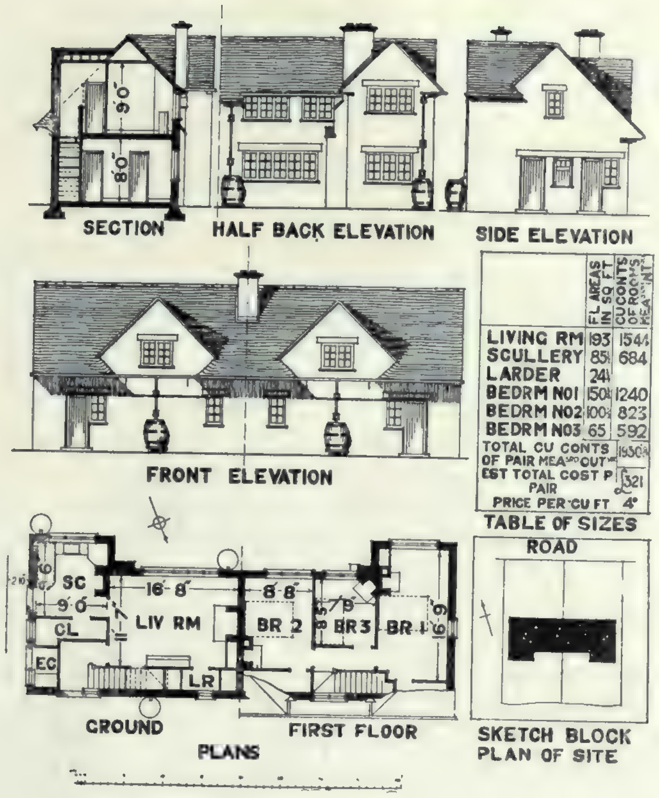




HAMPSHIRE TYPE.
C. E. MEE.

Dorset Type.—This pair is to be built in accordance with Schedule I. The plan adopted by Wallace Greenen, who won the first prize, shows the same general disposition of rooms as appears in the Kent first prize design, *i.e.*, the cottage is one room deep, and with a larger amount of outside wall than, for example, in the Hampshire type, which is two rooms deep. The former plan is rather more costly than the latter, but it has the advantage of providing a particularly good living-room with the entrance and scullery doors in the wall furthest from the fireplace. The larder also opens out of the living-room, and is very handy both for the fireplace and dresser. Rather more lobby space is provided than bare need dictates, but the cottager, like other people, will appreciate the little extra space which gives room for a perambulator or a hat and coat stand. The scullery is well planned, and being in part a passage room, cannot be used as a living-room, always a good point. The coal cellar is ample, and opens from the scullery, and an outside opening shoot is provided. This is a point which many competitors have neglected. They seem to assume that, in the country, coals are delivered in sacks which can be carried through the scullery and shot into the coal cellar, but this practice is almost exclusively confined to London, and an outside coal-shoot is therefore essential. The E.C. is under the main roof, but very well placed with its door to the side, and with no bedroom window immediately above it. The extended type of plan also gives a little more landing space than the more compact type of plan, two rooms deep. The three chimney-stacks mean extra expense, but they enable each bedroom to be equipped with a fireplace. The general treatment of the elevations is pleasing. The walls are 11 in. brickwork whitewashed, and the roofs of dark red tiles. The cubic content is rather higher than in some of the other cottages built to Schedule I., the result of Mr. Greenen giving a living-room of rather more generous proportions than absolutely necessary. It is unlikely that they could be built for 8c. per cubic foot, but there is nothing in the treatment to prevent them being built for 10c.

Somersetshire Type.—Sir Richard Paget specified Schedule II. as the accommodation for this pair of cottages, and that the material to be used for the walls should be the local cream-colored mountain limestone. With regard to the roof, he especially desired the assessors to give careful consideration to any designs which might be submitted, showing a flat roof on the ground that mere æsthetic considerations should not prevail against the demands of utility if modern constructional methods indicated that a flat roof

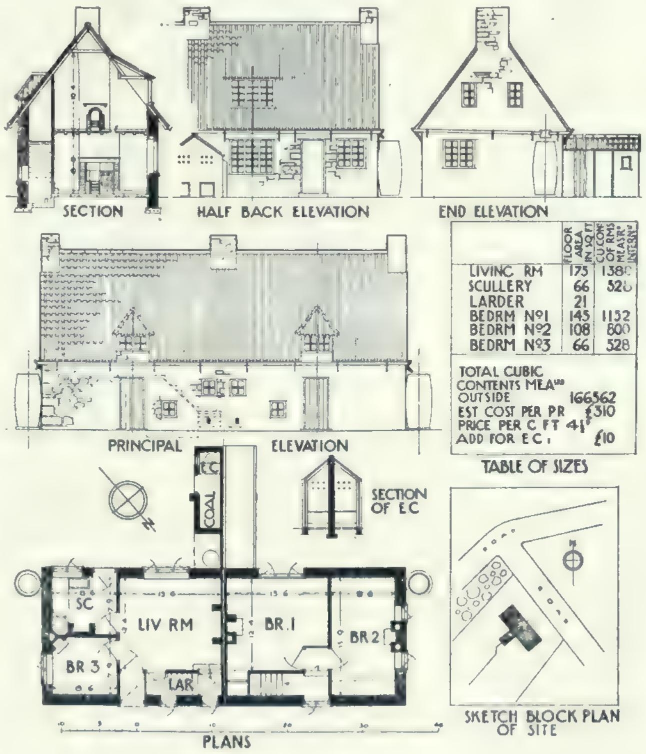


	FL AREAS IN SQ FT	CU CONTS OF ROOMS MEA^D INT^L
LIVING RM	193	1544
SCULLERY	85½	684
LARDER	24½	
BEDRM NO1	150½	1240
BEDRM NO2	100½	823
BEDRM NO3	65	592
TOTAL CU CONTS OF PAIR MEA^RD OUT^DE		19304
EST TOTAL COST P PAIR		£321
PRICE PER CU FT		4d

DORSET TYPE.
WALLACE GREENEN.

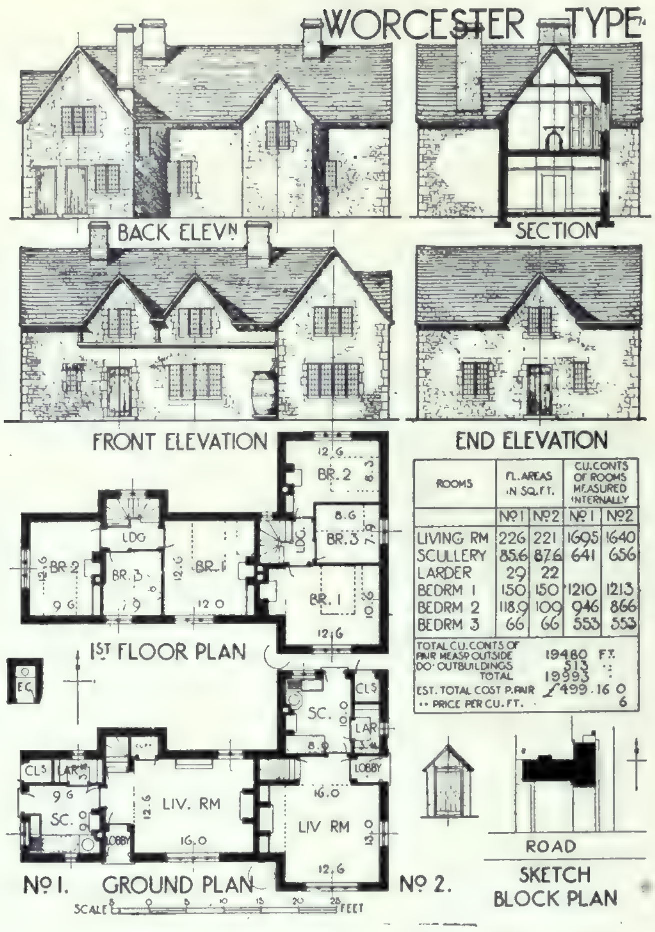
would give advantages either in better accommodation or in decreased cost. There were sixty competitors for this type, but only two of them tried the flat roof, and in neither case was the result at all satisfactory or worthy of much consideration. Where large buildings are concerned, and the cost permits of a concrete roof with an upper surface of asphalte to ensure weathertightness, a flat roof often presents great advantages. A good many experiments have been made with flat roofs for small industrial dwellings, but so far the results have been clearly unsatisfactory, and no flat roof design submitted in this competition, either for the Somersetshire type or for the special $1,215 pair, throws any fresh light on the subject. The first prize was therefore given to Cocker and Hill's design, in which they showed a pitched roof of Bridgewater double Roman tiles (a variety of pantiles), and the result is certainly very satisfactory. In order to keep the cost as low as possible Cocker and Hill put the third bedroom on the ground floor, with its door opening from the living-room. It is a matter for argument as to whether the entrance to it should not have been from the lobby, but it is to be borne in mind that this would prejudice the arrangement of the furniture, and especially of the bed. The scullery is very convenient in respect to the living-room, and the larder opens from the latter and has a north light. The staircase also rises from the living-room. The two bedrooms upstairs are well arranged. The cubic contents of the pair are 16,562 ft. (there is a clerical error in the printing of this figure on the plan schedule). It seems possible that with such a small amount of wall building these cottages could be built for 9c. a cubic ft., which, with the addition of the E.C. and coal-cellar, means a total cost of $1,555. The elevations realize the cottage character. Many competitors seemed to think it necessary to provide all manner of trivial little architectural features which fill no essential need and involve extra cost. Cocker and Hill dealt in a straightforward fashion with the problem set them.

Worcestershire (*Cotswold*) *Type.*—Among the counties represented in this competition the Cotswolds share with Kent the advantage of having a very strongly marked building tradition. It is, therefore, natural that this type should have been especially popular with competitors. Alexander Harvey and Graham Wicks have shown their singular grasp of various local manners by winning the first prize for this type as well as for Kent and for the difficult economical problem set by the $965 pair. This design is one of the very few submitted in the competition in which advantage was taken of the permission to make the plans of the two cottages of the pair somewhat different. Competitors were advised that uniformity between the two tended to lower costs. As Mr. Eyres-Monsell determined to have thoroughly attractive cottages rather than the most economical buildings possible, and set his limit of cost at $1,930 for the pair, Harvey and Wicks allowed themselves the pleasing liberty of designing a somewhat irregular group. The planning is thoroughly satisfactory. Criticism may be levelled at the



	FLOOR AREA IN SQ FT	CU CONT OF RMS MEASR^D INTERN^Y
LIVING RM	175	1380
SCULLERY	66	528
LARDER	21	
BEDRM Nº1	145	1132
BEDRM Nº2	108	800
BEDRM Nº3	66	528
TOTAL CUBIC CONTENTS MEA^RD OUTSIDE		166562
EST COST PER PR		£310
PRICE PER C FT		4½d
ADD FOR E C		£10

SOMERSETSHIRE TYPE.
COCKER & HILL.



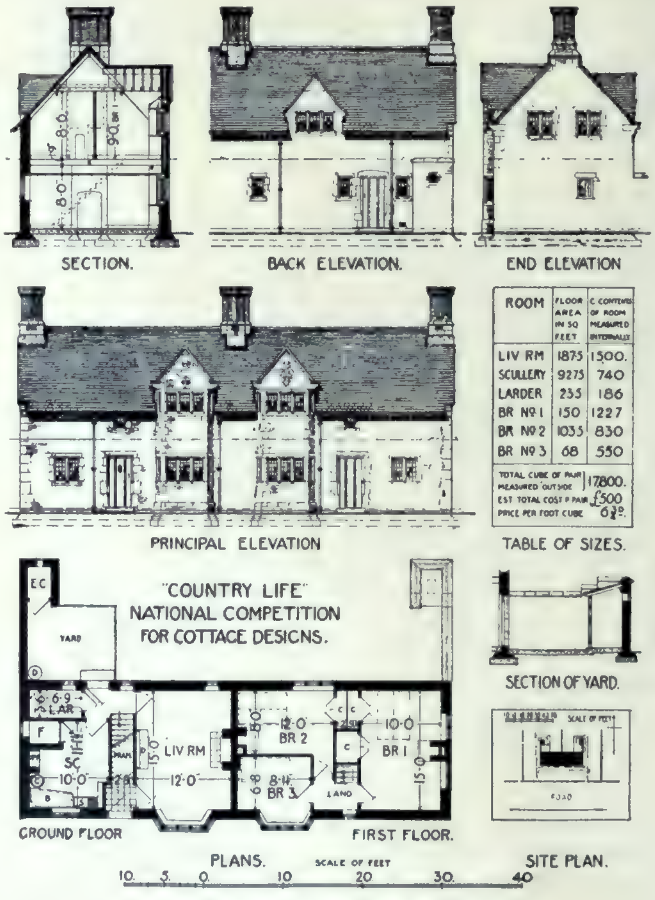
ROOMS	FL. AREAS IN SQ. FT.		CU. CONTS OF ROOMS MEASURED INTERNALLY	
	Nº 1	Nº 2	Nº 1	Nº 2
LIVING RM	226	221	1695	1640
SCULLERY	85.6	87.6	641	656
LARDER	29	22		
BEDRM 1	150	150	1210	1213
BEDRM 2	118.9	109	946	866
BEDRM 3	66	66	553	553

TOTAL CU. CONTS OF PAIR MEASD OUTSIDE 19480 FT.
DO. OUTBUILDINGS 513 "
TOTAL 19993 "
EST. TOTAL COST P. PAIR £499.16 0
" PRICE PER CU. FT. 6

WORCESTERSHIRE TYPE.
W. A. HARVEY AND G. WICKS.

fact that the staircase in each of the cottages rises from the living-room and not from a separate lobby; but in the winning design they are so placed as not to prejudice the comfort of the rooms, and this arrangement is part of the traditional Cotswold plan. In this type, as in Kent, the authors have given a rather larger living-room than is demanded by Schedule I., but in spite of this the total cubic capacity of the pair is under 20,000 ft., which works out at 12c. per cubic foot. This sounds a low price for stone-built cottages, but Arthur Parsons, the Quantity Surveyor who advised the assessors on all questions of cost which arose during the judging, was able to give examples of similar cottages built in the district at about this figure, and the quality of the design was such that the assessors did not hesitate to award it the first prize. The general treatment of the gabled projections and of the dormers is thoroughly typical of the district. It is not pretended that any economical problem is solved by the provision of five-roomed cottages at $965 or thereabouts for each cottage, but happily all landowners are not obliged to approach the housing question purely from the point of dollars. It is at least certain that Mr. Eyres-Monsell will be adding to the amenities of his estate by such a pair of cottages as this. One practical criticism must be directed to the design, namely, that the windows are rather taller than is desirable from an artistic point of view; and there is the further important consideration that where iron casements, even of a simple cottage section, are employed, their cost grows in a disconcerting fashion when a height of 3 ft. is exceeded. Doubtless the authors of the design will modify it a little in this respect when it comes to building. The Cotswold design submitted by Geoffry Lucas and Arthur Lodge is so pleasing and represents so justly the more refined type of work to be seen in the neighborhood, that the assessors thought it claimed an additional cash prize of $25.50. The cubic content was kept well in hand, and amounts to no more than 17,800 ft.; but it is none the less clear that it would be much more difficult to carry it out at 13½c. per cubic foot than to execute the first prize design at 12c. The two canted bays on the principal front would mean costly building, and the treatment of the chimneys, though very charming, is unduly elaborate for laborers' cottages. The design, moreover, is open to further criticism in respect of its plan. There are two doors between the scullery and the living-room, and a very considerable distance to travel between the scullery sink and the living-room fire. The bedroom cupboards, however, are a very good point.

Montgomeryshire Type.—There was a considerable number of plans submitted by archi-



ROOM	FLOOR AREA IN SQ FEET	C. CONTENTS OF ROOM MEASURED INTERNALLY
LIV RM	1875	1500.
SCULLERY	9275	740
LARDER	235	186
BR Nº 1	150	1227
BR Nº 2	1035	830
BR Nº 3	68	550

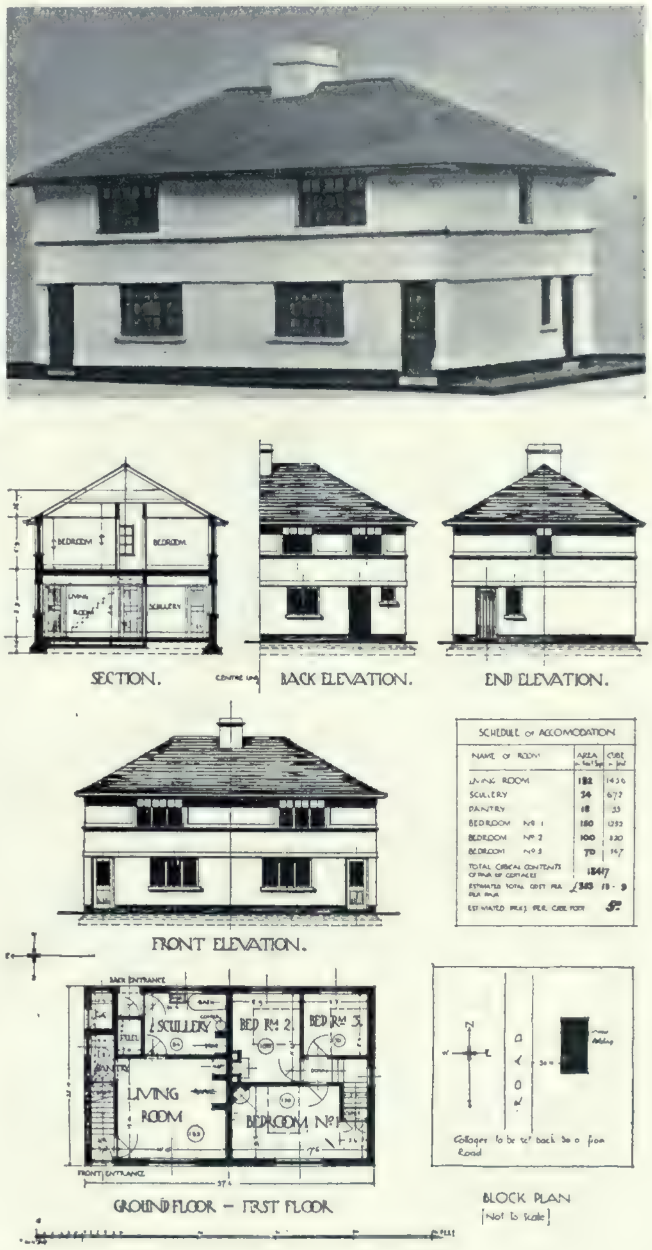
TOTAL CUBE OF PAIR MEASURED OUTSIDE 17800.
EST TOTAL COST P PAIR £500
PRICE PER FOOT CUBE 6¾D.

WORCESTERSHIRE TYPE—EXTRA PRIZE.
G. LUCAS AND A. LODGE.

tects practising in Wales, but they do not seem to have very fully appreciated that the type of rather "pretty" cottage appropriate to garden villages and suburbs in the South of England does not consort well with the rather severe traditions of cottage building in Wales. Of the eighteen pairs of cottages, only two, namely, Montgomeryshire and Cumberland, were specified to have slate roofs, though in the case of Northumberland, slates were an alternative to pantiles. It is a little difficult to resist the idea that many of the designers were repelled by the idea of slates, and that others did not understand that they involve a different quality of design from that appropriate to tile roofs. It is easy to understand that the vulgarity of the speculative builder's cottage roof with thin, purple slates, has caused less attention to be given to the artistic possibilities of slate than is their due.

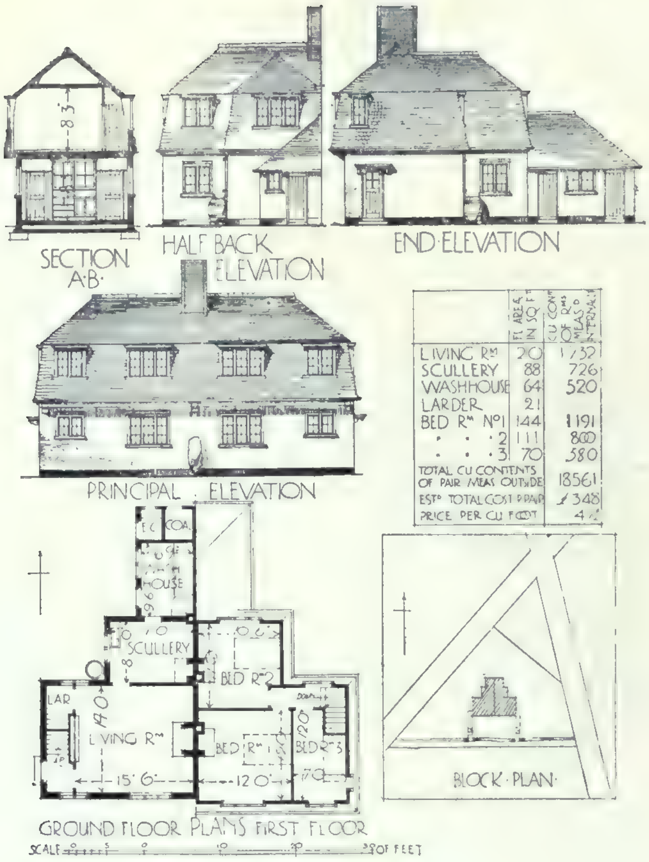
Mr. Hannaford's pair of cottages with its single chimney-stack, broad bandings of projecting plaster which mark the sills and heads of the windows, and the unbroken roof with broad eaves, may not be very amusing elements in design, but they represent a simplicity which is very proper in Wales. The plan is straightforward. There is a good living-room, a scullery with sink placed almost in view of the kitchen range, and a good fuel house. The position of the E.C. door next to the pantry window is not ideal; indeed, an E.C. under the main roof is never satisfactory. It is the practice so to place them at Llandinam, but there is little doubt that public opinion (if not better by-laws) will tend to their disuse. They should certainly be detached whether or not they are connected by a covered way with the main block. In other respects, the plan both downstairs and upstairs is thoroughly good. The staircase is well placed and easy, and although there is only one chimney stack for the two cottages, it is only the third bedroom which is without a fireplace.

North Lincolnshire Type.—This pair is one of the two out of the eighteen in which the owner specified that the wash house should be in a single storey back addition, with no bedroom over it. As these requirements reduce the ground floor area of the main block, competitors were at liberty to reduce the floor area of the bedrooms to the limits of Schedule II. The site was an interesting one, because it has a frontage to two roads, and Captain Weigall laid it down that the principal front should face due south. As both elevations of the cottages will be seen equally well from the road, special care needed to be given to the design of the back. The winner of the first prize, John Hudson, worked out a reasonable design well in accord with the local traditions, and has provided a particularly good living-room of 210 square feet, with both larder and scullery opening from it. The larders of both cottages face north. The scullery sink is conveniently placed, so that the housewife can see what is going on in the living-room. The back addition wash-house opens from the scullery, and the E.C. meets the by-law requirements that it shall be at least 10 ft. from the main block. The variation in the by-law provisions in different localities is notorious and confusing. The time has surely come when steps should be taken by the Local Government Board to secure greater uniformity. Some rural local authorities, but by no means the majority of them, lay down that the E.C. shall be 10 ft. from the main building, and there is a growing tendency among housing reformers to insist that this plan shall be made universal. In the majority of the types now illustrated, the E.C. is



MONTGOMERYSHIRE TYPE.

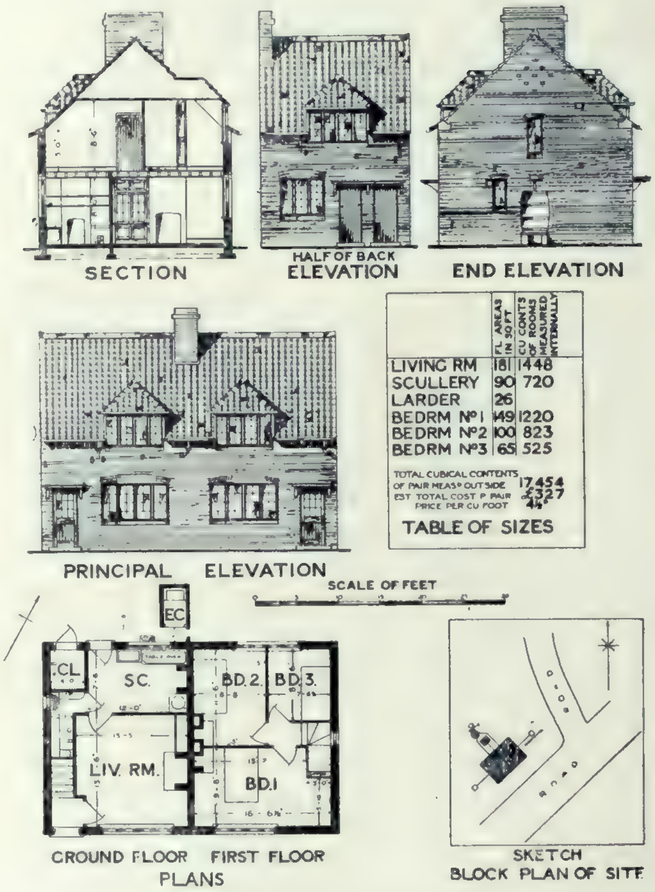
LEONARD HANNAFORD.



	FL AREA IN SQ FT	CU CONT OF Rᴹˢ MEAS INTERNALLY
LIVING Rᴹ	20	1732
SCULLERY	88	726
WASHHOUSE	64	520
LARDER	21	
BED Rᴹ Nº1	144	1191
· · 2	111	800
· · 3	70	580
TOTAL CU CONTENTS OF PAIR MEAS OUTSIDE		18561
ESTᴰ TOTAL COST ᴾ PAIR		£348
PRICE PER CU FOOT		4½

NORTH LINCOLNSHIRE TYPE.

JOHN HUDSON.

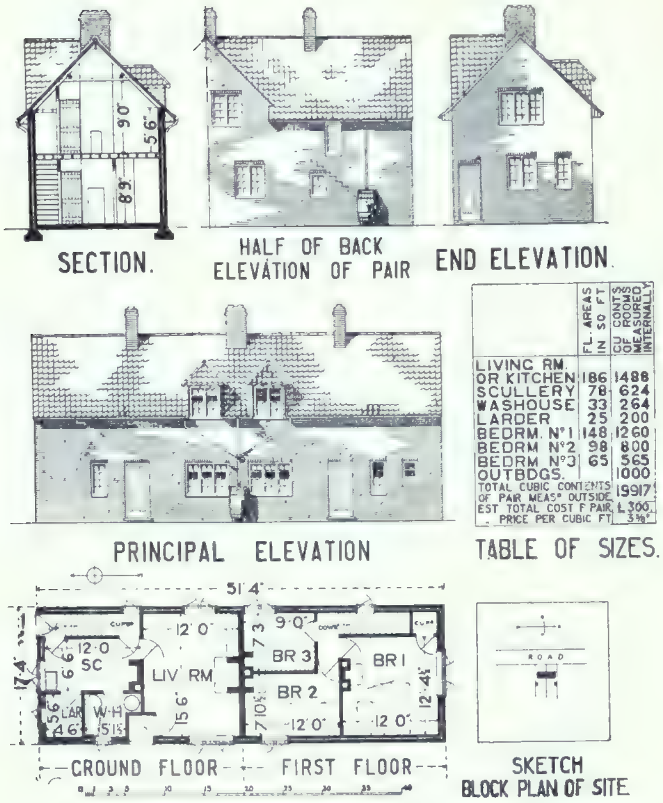


	FL. AREAS IN SQ FT	CU CONTS OF ROOMS MEASURED INTERNALLY
LIVING RM	181	1448
SCULLERY	90	720
LARDER	26	
BEDRM Nº1	149	1220
BEDRM Nº2	100	823
BEDRM Nº3	65	525
TOTAL CUBICAL CONTENTS OF PAIR MEASᴰ OUTSIDE		17454
EST TOTAL COST ᴾ PAIR		£327
PRICE PER CU FOOT		4½ᵈ

TABLE OF SIZES

YORKSHIRE WEST RIDING TYPE.

C. HALL AND DAWSON.

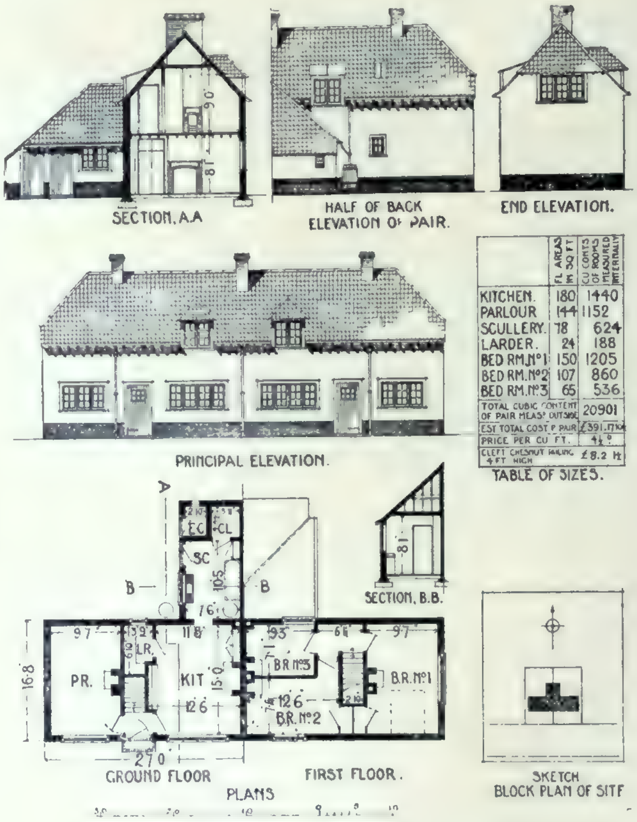


	FL. AREAS IN SQ FT	CU CONTS OF ROOMS MEASURED INTERNALLY
LIVING RM. OR KITCHEN	186	1488
SCULLERY	78	624
WASHOUSE	33	264
LARDER	25	200
BEDRM. Nº1	148	1260
BEDRM Nº2	98	800
BEDRM Nº3	65	565
OUTBDGS.		1000
TOTAL CUBIC CONTENTS OF PAIR MEASᴰ OUTSIDE		19917
EST TOTAL COST ᴾ PAIR		£300.
PRICE PER CUBIC FT		3⅝ᵈ

TABLE OF SIZES.

SOUTH LINCOLNSHIRE TYPE.

E. C. P. AND H. MONSON.



	FL AREAS IN SQ FT	CU CONTS OF ROOMS MEASURED INTERNALLY
KITCHEN.	180	1440
PARLOUR	144	1152
SCULLERY.	78	624
LARDER.	24	188
BED RM.Nº1	150	1205
BED RM.Nº2	107	860
BED RM.Nº3	65	536
TOTAL CUBIC CONTENT OF PAIR MEASᴰ OUTSIDE		20901
EST TOTAL COST ᴾ PAIR		£391.17.10
PRICE PER CU FT.		4½ᵈ
CLEFT CHESNUT FENCING 4 FT HIGH		£8.2 ½

TABLE OF SIZES.

YORKSHIRE NORTH RIDING TYPE.

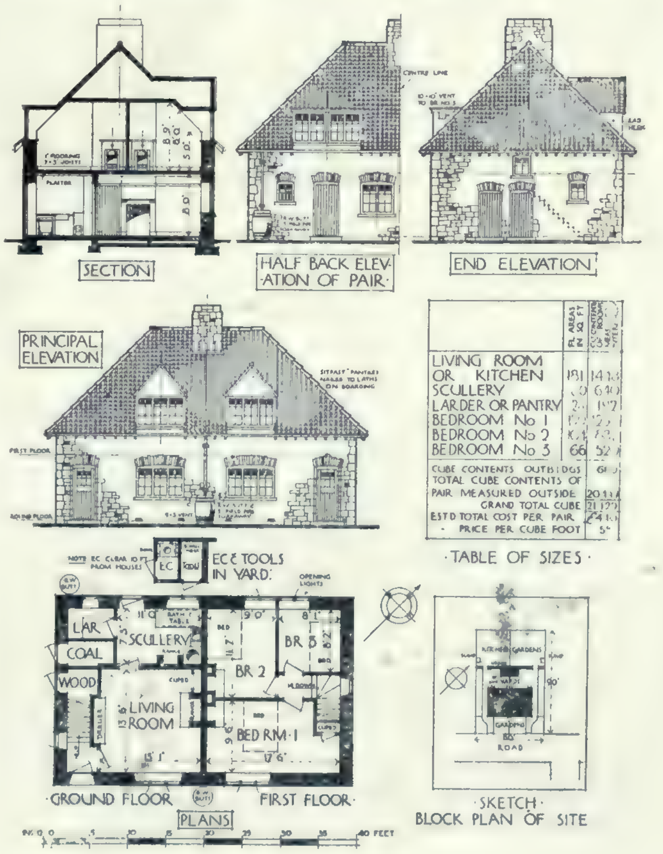
E. POLEY.

COTTAGE DESIGNS.

under the main roof, but with an outside door. This plan is obviously convenient, but convenience should be sacrificed if public health demands it. Whatever the critics of the prevailing by-law confusion may say as to the undue restrictions often imposed with regard to height of rooms, methods of construction, etc., all are agreed that due sanitary regulations are of outstanding importance. The time has come for revision of by-laws in this respect, and it is good news that the Local Government Board is moving in this direction. It is much to be hoped that the position of E.C.'s will receive careful consideration, and that some uniform regulation may be adopted. It is surely carrying local discretion too far to leave such an urgent matter of public health to be settled by rural councillors. There is little doubt that such a plan for the placing of E.C.'s as Mr. Hudson has devised for the North Lincolnshire type is most satisfactory in practice.

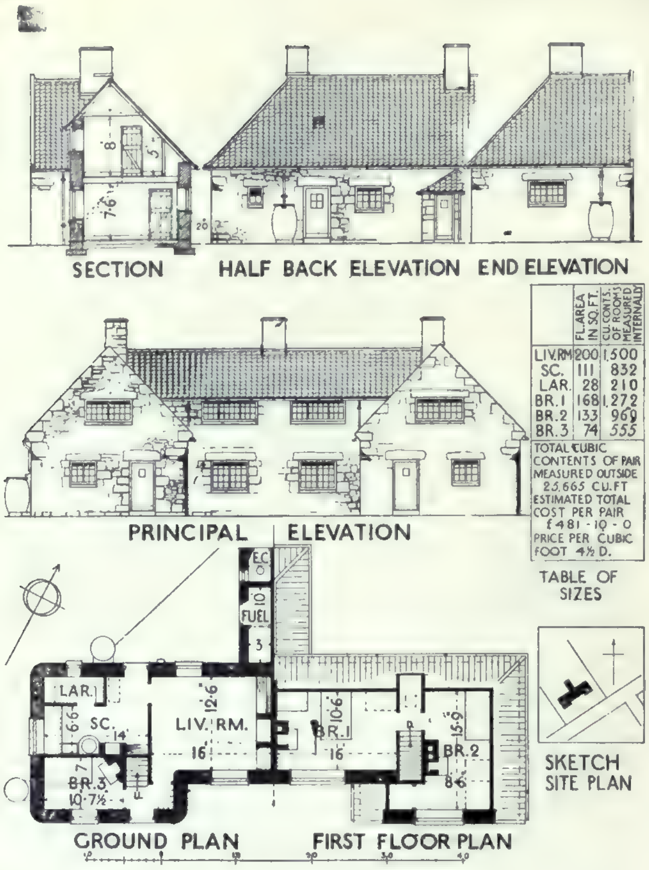
The elevations of the cottages are soberly contrived, and the mansard roofs should look well. It is to be borne in mind that a wash-house and E.C. in a back addition involve a more costly roof construction than in the case of cottages of simple oblong plan. There is another point to be settled where a plan of this kind is used, namely, that the two wash-houses of the pair should certainly be back to back and placed under one roof instead of being separte projections from the outer ends of the pair of cottages. This not only secures economy in construction, but provides that the doors of the scullery, wash-house, E.C., etc., shall face outwards instead of inwards across a little court, an arrangement which some competitors favored. Where the latter plan is adopted, the tenants of the two cottages cannot help witnessing each other's domestic concerns, and this is undesirable. With regard to the cost of his design, Mr. Hudson has succeeded in keeping the cubic content within reasonable limit, and the total cost per pair works out to $1,700, at a cubic foot price of 9c. The latter figure is too optimistic; but even at 10c. Mr. Hudson has only slightly exceeded Captain Weigall's sum of $1,845.

South Lincolnshire Type.—Presumably the extreme interest of the problem of providing a pair of cottages to be built for $965 in South Lincolnshire for so enthusiastic an advocate of housing as Christopher Turnor deflected the efforts of competitors from the $1,460 pair, which he had also offered to build. The entry under this head was disappointing, and the assessors, therefore, did not award any first prize. An extra cash prize of $51.00, however, was given to E. C. P. and H. Monson for their design. The staircase rises from the lobby adjoining the back door, whereas in the majority of the prize designs it is placed in the same relation to the front door. The wash-house is separate from the scullery, an arrangement which does not seem to be advisable unless the wash-house is a separate back addition without any part of a bedroom over it. Messrs. Monson's purpose in



NORTHUMBERLAND TYPE.

WILFRID LAWSON.



	FL. AREA IN SQ. FT.	CU. CONTS. OF ROOMS MEASURED INTERNALLY
LIV. RM	200	1,500
SC.	111	832
LAR.	28	210
BR. 1	168	1,272
BR. 2	133	969
BR. 3	74	555
TOTAL CUBIC CONTENTS OF PAIR MEASURED OUTSIDE 25,665 CU. FT ESTIMATED TOTAL COST PER PAIR £481-10-0 PRICE PER CUBIC FOOT 4½ D.		

EXTRA PRIZE.

NORTHUMBERLAND TYPE.

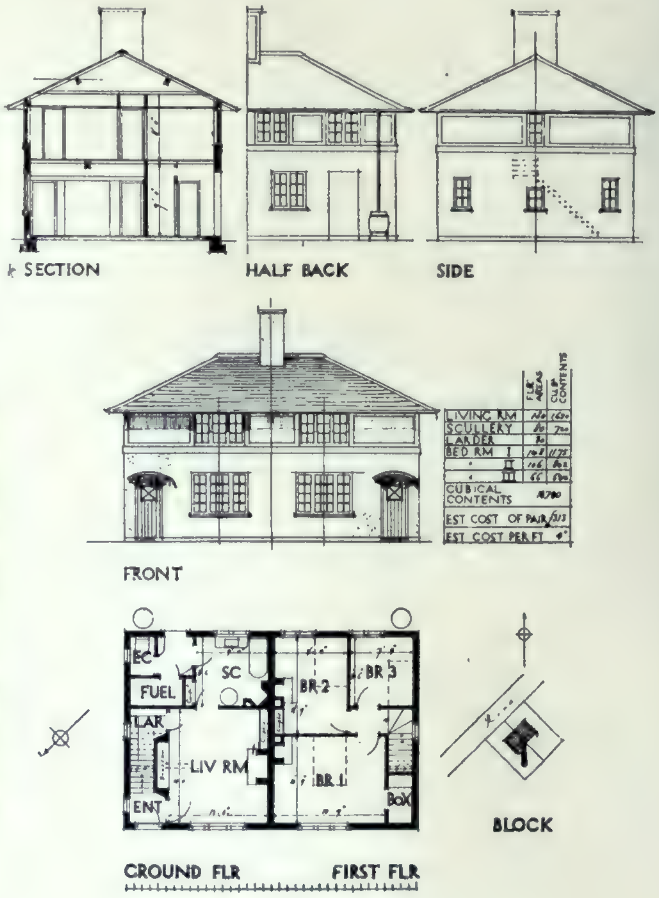
MAUGHLEN AND WEIGHTMAN.

this arrangement was to utilize the spare space available in consequence of all three bedrooms being on the first floor, and also to give greater privacy to the users of the bath. Their memorandum further makes the point that the steam from the copper is thereby cut off from the living-room. As, however, steam-consuming coppers can readily be obtained, this is not so important a safeguard as it once was. It does not appear why there should be an extra window on the principal front of the pair to the right of the wash-house window, but perhaps it is to ensure a less sunny aspect for the larder window. That is a good point, but too much can be made of it. The main thing is to get a larder window reasonably small, and it can always be protected by a shutter. The authors of this plan worked on a high cubic capacity, nearly 20,000 cubic feet, and the cost they suggest, $1,460, at 7c. per cubic foot, is, it need scarcely be said, quite an unpractical idea.

Yorkshire West Riding Type.—The limits of cost laid down by George R. Lane-Fox—namely, $1,625 for a pair of cottages to Schedule I.—made this problem by no means easy. The winners of the first prize, Carby Hall and Dawson, of Leeds, worked out their plan very closely to the schedule. In this connection it may be said that a good many most admirable designs received for this and other types put themselves out of court by what seems to be rather a wanton disregard of the schedules specified for the various types. The disposition of the rooms both downstairs and upstairs is satisfactory, and the only criticism to be made is that the scullery has ten square feet more in floor area than the schedule demands. It would have been better if the plan had been modified so that this extra 10 ft. had been allocated to the living-room. In cottages where there is no parlor it is very desirable that sculleries should be so planned as to discourage their use as living-rooms. The tendency of cottage tenants is to cling to the idea of a best room where their household gods may be properly displayed. There are too many cottages in this country where the kitchen living-room is not used for living in, and this is all to the bad. The best room in the cottage is sacri-

CUMBERLAND TYPE.

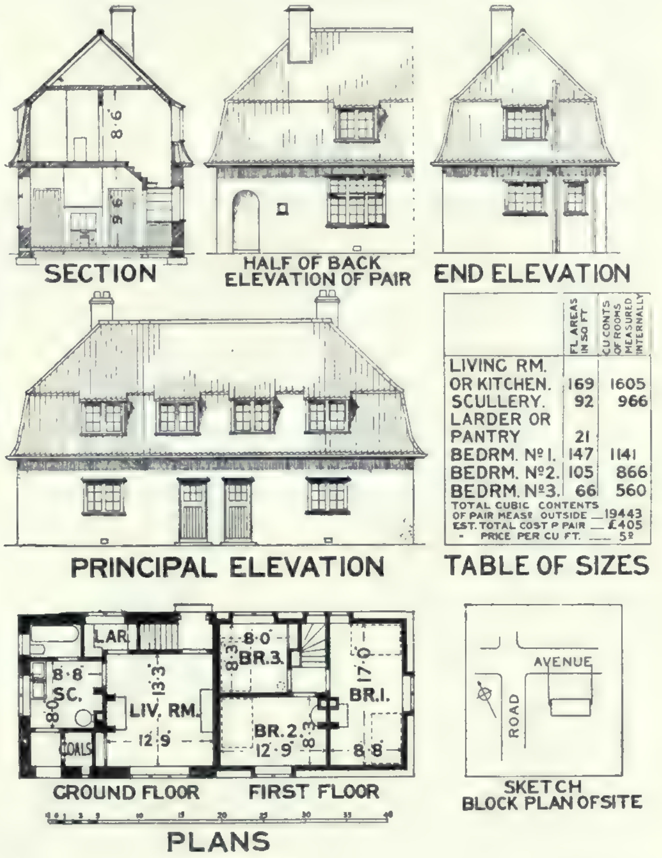
C. W. EATON.



ficed to a sentiment, and the family crowds into a small, inconvenient and inevitably dirty scullery. It is for this reason that large and comfortable sculleries are a mistake. Cottagers should be compelled by the logic of necessity to live in their best room, and not to preserve it as a museum for chairs on which they do not wish to sit and for ornaments which they do not see, except perhaps on Sunday afternoons. If it were not for the fact that the economic question is overwhelming at present, there is no doubt that the ideal arrangement is to provide a parlor, however small. Some authorities on housing are loud in their condemnation of the provision of a parlor in any cottage, but this seems unreasonable. When all is said, a parlor, with its collection of often useless furniture, is the symbol of a social ambition which is entirely healthy. There is, moreover, a more practical consideration looming ahead. The whole trend of educational opinion is in the direction of advancing the age at which children will be permitted to stop their education. If the scope of primary schools is to be increased in this respect, the higher standard of training will bring with it the need for home lessons in the evening. Anyone who is familiar with cottage life in the country will know how difficult it would be for children to work at their books in the common living-room, and the time is coming, therefore, when a parlor will be an increasing necessity. It is desirable, therefore, that landowners and others who contemplate building shall not rule out parlors as needless luxuries. The first prize design shows a simple treatment of brick walls and pantiled roofs with hipped dormers, which is thoroughly suited to Yorkshire. The cubic content has been kept within the lowest possible limits at 17,454 ft., which represents 9c. per cubic foot. This again is an optimistic figure, but the addition of 10 per cent. may probably meet the case.

DUMBARTONSHIRE TYPE.
WM. H. HOWIE.

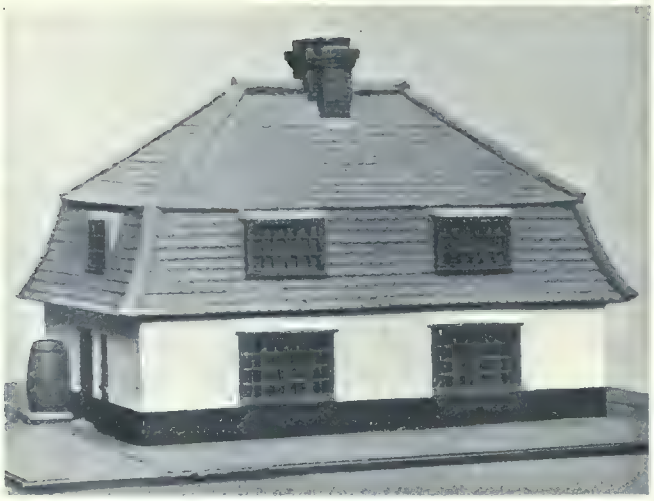
Yorkshire North Riding Type.—This type was one of the two out of the eighteen in which a parlor was to be provided. The price was limited to $1,950 the pair, and the scullery was specified to be in a back addition. The winner of the first prize, E. Poley, kept closely to the schedule sizes of rooms. The parlors are at the ends of the block and entered through the front lobby, a good and practical arrangement. The kitchen is a thoroughly livable room, and the larder and scullery open from it. The E.C. is well placed at the far end of the back addition, with the coal cellar adjoining. The bedroom plan is simple and convenient. The external treatment, with the ends half hipped and thus allowing the bedroom window to be in the wall instead of being in a dormer, is well conceived, and the proportions of the front with its two hipped dormers are satisfactory. At 9c. a cubic foot the cost of the cottages would come within Sir Hugh Bell's limit, and even if the price worked out at 10c. the cottages would still be good value, considering their accommodation and appearance.

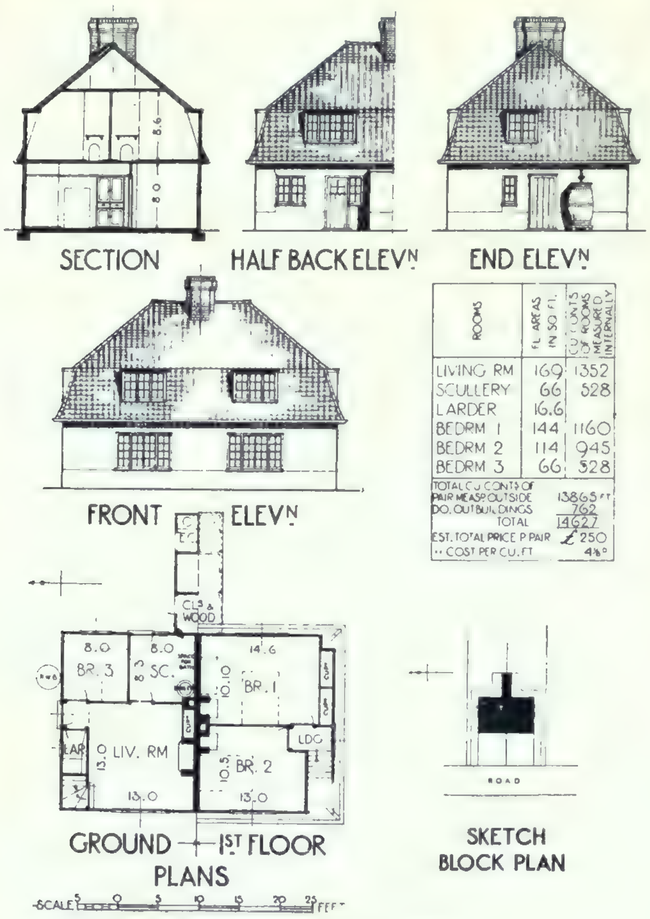


	FL AREAS IN SQ FT	CU CONTS OF ROOMS MEASURED INTERNALLY
LIVING RM. OR KITCHEN.	169	1605
SCULLERY.	92	966
LARDER OR PANTRY	21	
BEDRM. Nº1.	147	1141
BEDRM. Nº2.	105	866
BEDRM. Nº3.	66	560

TOTAL CUBIC CONTENTS OF PAIR MEASᴰ OUTSIDE — 19443
EST. TOTAL COST P PAIR — £405
" PRICE PER CU FT. — 5ᴰ

Northumberland Type.—No limit of cost was laid down except that it was to be as low as might be consistent with the observance of the conditions. The walls were to be of the hard local freestone, and the roofs either of slates, which were, however, costly, or of pantiles, which are strictly in the Northern tradition. It must be confessed that the work of the assessors in this section was a little difficult, because Mauchlen and Weightman submitted a design of unusual artistic charm. Their long, low roof and the feeling that the cottages would look as





ROOMS	FL. AREAS IN SQ. FT.	CU. CONTS OF ROOMS MEASURED INTERNALLY
LIVING RM	169	1352
SCULLERY	66	528
LARDER	16.6	
BEDRM 1	144	1160
BEDRM 2	114	945
BEDRM 3	66	528

TOTAL CU CONTS OF PAIR MEASD. OUTSIDE	13865 FT
DO. OUTBUILDINGS	762
TOTAL	14627
EST. TOTAL PRICE P PAIR	£250
" COST PER CU. FT	4⅛D

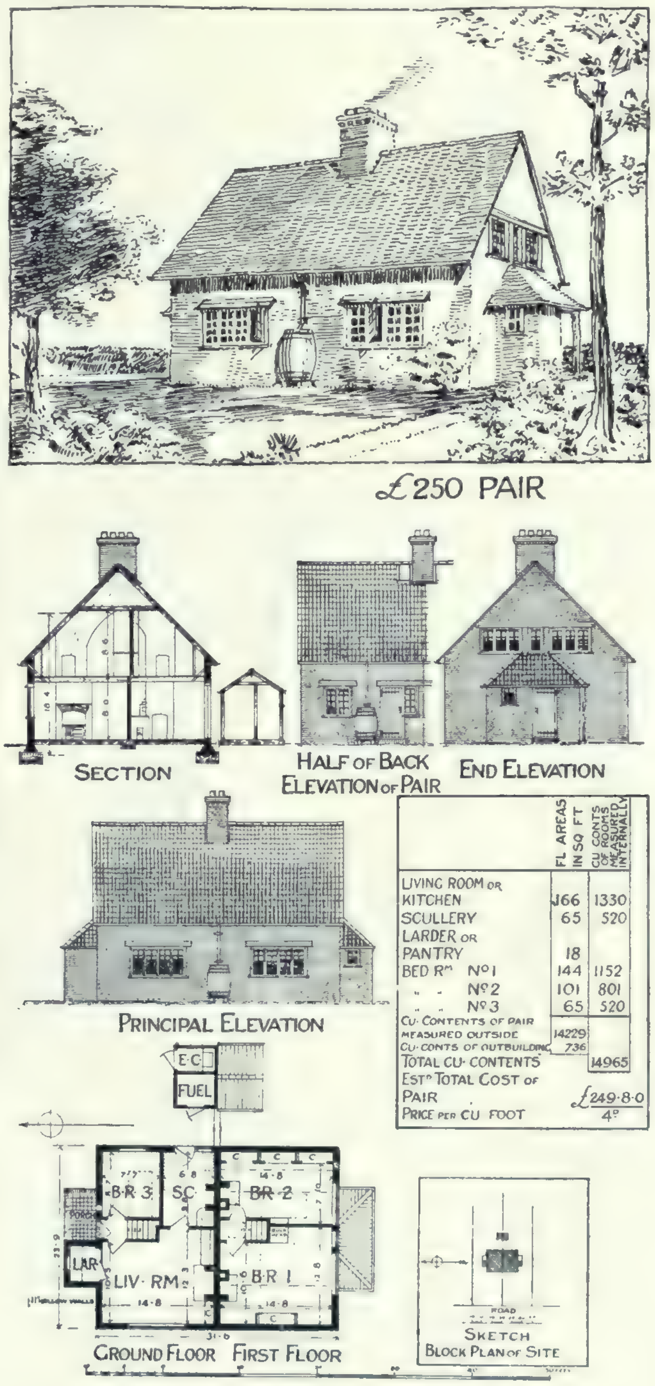
SPECIAL PAIR COTTAGES.
W. A. HARVEY AND H. G. WICKS.

though they had grown naturally out of the ground was greatly in their favor. The plan, however, was not so satisfactory as that which secured the first prize. In the first place, the third bedroom was downstairs, an arrangement more consonant, it is true, with Northern than with Southern habits, but still unsatisfactory, especially in the larger type of cottage contemplated by Schedule I. In Schedule II, with its smaller size of living-rooms, it is very difficult to get all three bedrooms upstairs. Furthermore, the conditions stated that the site is extremely exposed, which would make a "through" living-room with windows both to the north and south a good deal colder than if it were lighted from the south side only. The long type of plan, with the large amount of external wall it involves, means considerably extra cost, and, indeed, the content of this pair was nearly 5,000 cubic feet greater than in the first prize design. Nevertheless, Mauchlen and Weightman so justly expressed the Northumbrian tradition of building that an extra cash prize of five guineas was awarded to them. The first prize design by Wilfrid Lawson is a more practicable proposition. The plan is more ordinary in character, but much more convenient, and all three bedrooms are on the first floor. The dormers are no doubt larger than is ideal on the grounds of appearance, but they give very well lighted bedrooms, and one chimney-stack, common to the pair, is an economical advantage in stone-built cottages. It is very doubtful whether, with masonry walls, the total cost suggested by Mr. Lawson, namely, $2,150, at 10c. per cubic foot, can be realized, but, at all events, this figure is much more credible than the 9 cents per cubic foot indicated for Mauchlen and Weightman's design.

Cumberland Type.—The Cumberland type is one in which the local by-laws in force seem (and not unreasonably) to have frightened competitors. The regulations specify that the ground floor rooms shall be 9 ft. in height. As, moreover, the cost is not to exceed $1,555 the pair, and as the method of construction specified was the somewhat inelastic one of concrete blocks rough-cast and whitewashed, the number of entries was smaller than for most of the other types. It is a truism to say that construction necessarily exerts profound influence on design. Concrete blocks as a material suggest something rather solid and uncompromising. The somewhat exposed situation of the site, and the fact that Cumberland has the reputation of being a rainy county, caused the more thoughtful competitors to aim at a very simple unbroken roof, and to provide broad, overhanging eaves. The low limits of cost, moreover, indicate a compact and square plan rather than the extended type of plan which made the Kentish design, for example, so very attractive. It may be admitted at once that there is nothing romantic about the solution of the problem worked out by the winner of the first prize, C. W. Eaton, but he has done the best he could within the narrow limits stated. The living-room is lighted on one side only, which is good in a cold and wet climate. The scullery is conveniently placed with reference to it, and the disposition of the staircase and bedrooms is good and straightforward. He has gathered all his flues into one chimney-stack, and has given a little character to the otherwise rather boxlike design by indicating a simple panelled treatment on the upper part of the walls which will do much to mitigate their severity. Owing to the great waterproof merits of slating (Cumberland is a purely slate county) the pitch of the roof could be kept very low, and in consequence there is the minimum of waste cubic space. As to whether, even with concrete block building, the pair could be put up at 8 cents per cubic foot is very doubtful; but at least this is true, Mr. Eaton has kept carefully within the limits of accommodation laid down in Schedule I, and it is not apparent how he could have designed a seemly pair of cottages (given the conditions and the by-law regulations) on any more economical lines.

MODEL OF COTSWOLD COTTAGES.
LIONEL F. CRANE.

Dumbartonshire Type.—The problem which the Scottish competitors had to face was greatly complicated by the extremely drastic by-laws enforced by the Burgh of Clydebank in the district where this pair of cottages is to be built. In fifteen of the other districts the habitable rooms on the ground floor need to be no more than 8 ft. in height, in one other they must be 8 ft. 3 in., in a second 9 ft., but in Clydebank 9 ft. 6 in. is the minimum. This condition operates very harshly against the attempt to build a decent pair of cottages for anything like $1,460. W. H. Howie took advantage of the permission (notified in the replies to competitors' enquiries) that the floor area of the living-room might be reduced below the standard of Schedule I, originally specified; but, even so, the by-law height makes the cubic content of the rooms much more than laid down in the schedule. The cottages are entered from the avenue, and the staircase rises direct from the lobby. The living-room is a good square apartment, with the doors all on its north side, leaving the space between the kitchen range and south window quite unimpeded. The position of the scullery sink is not ideal with reference to the living-room fireplace, but the housewife, by taking a few steps from the sink can control what is going on in the living-room. The bathroom opens out of the scullery, as provided in the conditions. The larder is very well placed, with a north aspect, and the stairs are compactly contrived with the minimum of space for landing. The elevation is very seemly, with its pantiled mansard roofs, and the small roofs of the dormers are continuations of the main roof, a good point in economical construction. Waste space has been reduced to a minimum: the back porch on the south side is a practical thought, as it is provided to afford protection from the south-west gales. It is quite possible that these cottages, with their simple roof construction and small amount of wall, can be built for 10 cents per cubic foot, as Mr. Howe suggests. In any case, it is not clear how the same accommodation could be obtained on any more economical plan.



	FL AREAS IN SQ FT	CU CONTS OF ROOMS MEASURED INTERNALLY
LIVING ROOM OR KITCHEN	166	1330
SCULLERY	65	520
LARDER OR PANTRY	18	
BED Rᴹ Nº1	144	1152
" " Nº2	101	801
" " Nº3	65	520
CU· CONTENTS OF PAIR MEASURED OUTSIDE	14229	
CU· CONTS OF OUTBUILDING	736	
TOTAL CU· CONTENTS		14965
ESTᴰ TOTAL COST OF PAIR		£249·8·0
PRICE PER CU FOOT		4ᴰ

PAIR OF COTTAGES, BOOK PRIZE.
ARTHUR KEEN.

The Burgh by-laws insist on 14 in. walls, which is half a brick thicker than the by-laws affecting any other district covered by the competition. This was a further severe handicap to competitors in their attempt to design inexpensive cottages.

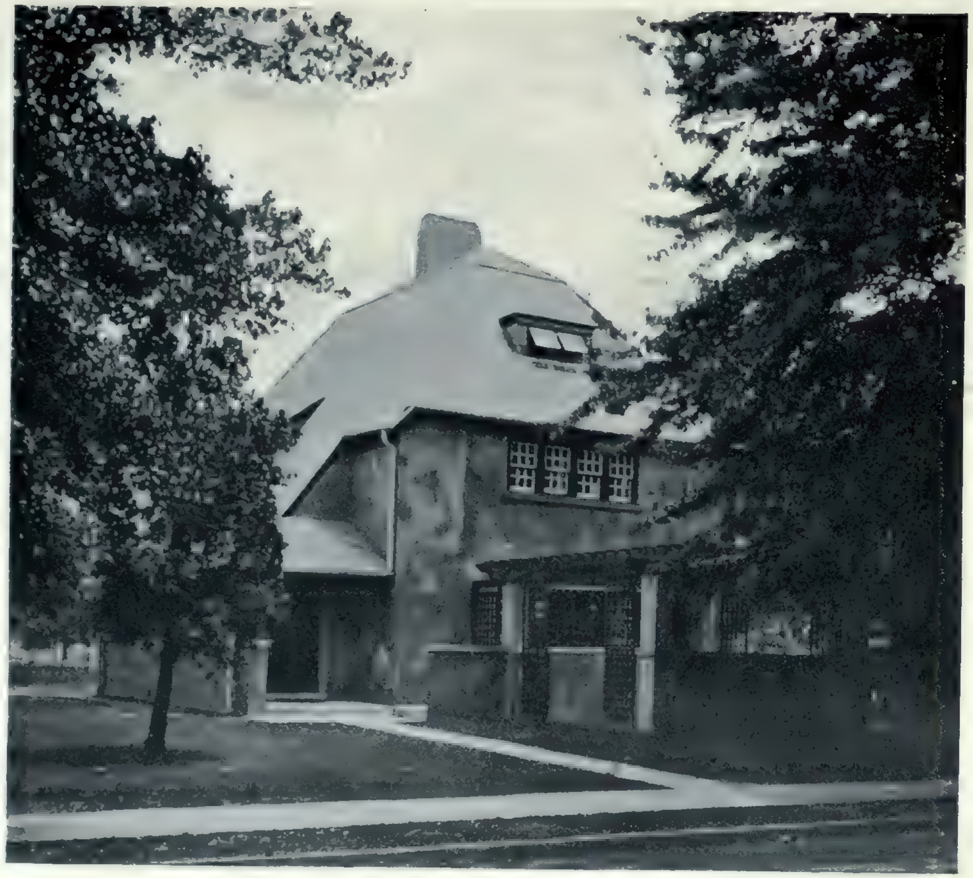
South Lincolnshire: Special $965 Pair.—In many respects this section of the competition has been the most popular and the most interesting. It set the problem of establishing not only the simplest plan, but in general the most economical treatment of a pair of cottages, consistent with decent accommodation. A large number of designs of the greatest variety were submitted. Alexander Harvey, of Harvey and Wicks, who secured the first prize, may be regarded as one of our greatest experts on the cheap cottage problem, because he is the architect who designed the majority of the cottages at Bournville, one of the earliest and most successful of the garden suburbs. A glance at the accompanying plan shows that extreme simplification in the disposition of the rooms has been secured without any loss of comfort. The scullery is most conveniently placed with reference to a kitchen-living-room of good size and convenient proportions. The third bedroom is downstairs, as is inevitable in the smallest type of cottage, but it opens from an entrance lobby inside the front door, and although Mr. Harvey does not show on his drawings a door dividing this lobby from the living-room, there is no reason why one should not be provided. The staircase rises from the corner of the living-room and not from a separate lobby, and although this is not ideal, it means a saving of cost which cannot be disregarded. Both the upstairs bedrooms are of good size, and indeed No. 2 is 14 ft. larger in floor area than Schedule II demands. Coals, wood and E.C. are provided in a back addition, so arranged that the E.C. is 10 ft. from the main block. The walls are carried up to the sill level of the first floor windows, and almost the whole of the first floor rooms is consequently in the roof. There are six dormer windows, but of very inexpensive construction, and a single chimney-stack serves all the rooms in the pair except the downstairs bedroom. The appearance is thoroughly satisfactory, and the cottages would look well in any district where pantiles are employed, which means a considerable proportion of England and Scotland. We come now to the question of construction. Mr. Harvey provides that the party wall between the cottages shall be of 9 in. brickwork, to allow for ordinary brick flues, but the walls and the floor are provided to be of reinforced concrete on a patented system. It is needless to discuss this method of construction now, but it must be pointed out that the thin walls thus obtained enable the total content of the pair of cottages with their outbuildings to be kept down to the very low total of 14,627 cubic feet, which, at 9 cents per cubic foot, represents $965.

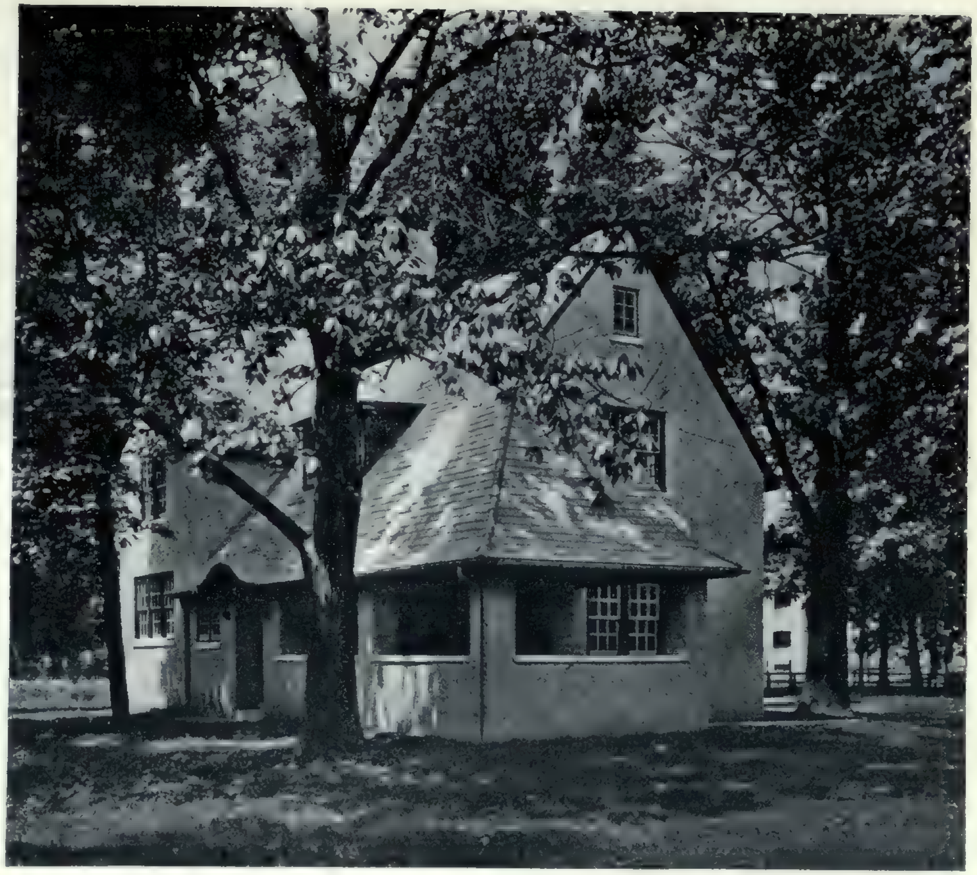
Of the designs for a pair for which a book prize was awarded, one of the most interesting was that by Arthur Keen. The downstairs bedroom opens fro ma lobby within a porch, the latter forming a little projection with the larder. The scullery is conveniently placed with respect to the living-room, and there are two excellent bedrooms upstairs. The general appearance of the pair is satisfactory, and the whole construction is so simple that it has more chance of being carried out for 8 cents a cubic foot than most of the other designs submitted. Indeed, it is evidently the outcome of considerable thought, for the rooms accord very closely with Schedule II.

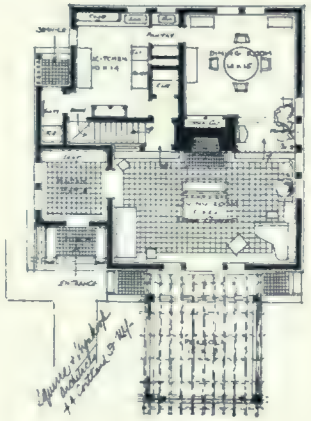
Models.—The response to the invitation that competitors should submit models with their cottage designs was most satisfactory. Lionel Crane repeated the success which he achieved in the last *Country Life* competition and won the first prize with an altogether admirable model of his design for the Worcestershire type. The construction of the model is not unduly fine and detailed, and that is as it should be. It is not desirable that models of houses should be finished with that extremely fine and meticulous regard for detail which is appropriate in an engineering model or one prepared for use in a Law Court. Mr. Cranes model stood out markedly from the rest by the satisfactory way in which the texture and color of the stone walls and roof were represented. Like most of those submitted, it was to the scale of one quarter of an inch to a foot, which may be taken as the best scale for the models of cottages and small houses.

The labors of the jury of assessors appointed to consider the designs submitted in the National Competition were unusually heavy, because nearly 900 architects sent in plans. Some competed for more than one type, and the total of drawings examined was about 1,500. These figures are sufficient evidence that the architectural profession has given a cordial response to our appeal for a solution of the problem of the agricultural laborer's cottage, on lines which would at once ensure comfortable homes and seemly additions to the countryside.

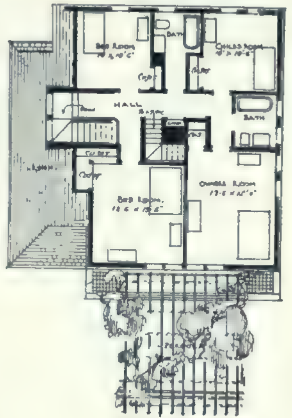
The conditions provided that in the event of the designs submitted for any country type being unsatisfactory, the jury might withhold the prize for that type, which has occurred in one case only. It was also stipulated that in the event of one competitor winning the first prize for more than one type, he should receive the full prize for one only, and share the others with the authors of the next best. Harvey & Wicks won first place for three types.







·FIRST FLOOR PLAN

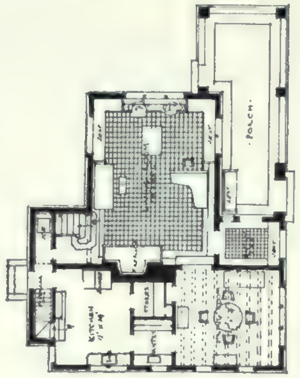


·SECOND FLOOR PLAN

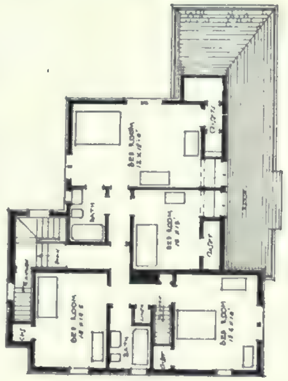
HOUSES AT MOUNTAIN STATION, N.J.

SQUIRES & WYNKOOP, ARCHITECTS.

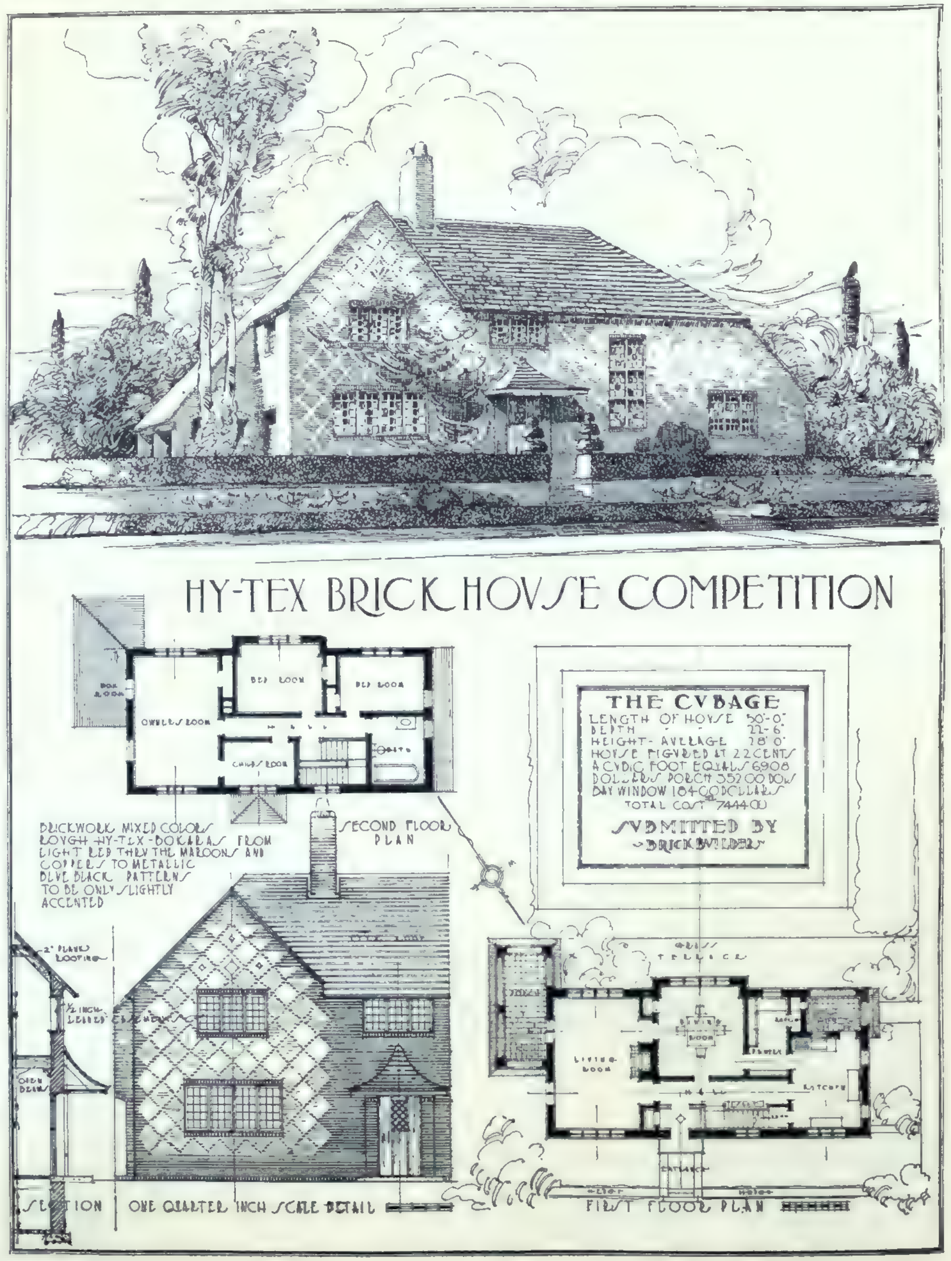
Built of hollow tile with finish of cement stucco. Roofs of asbestos shingles. The third story consists of two bedrooms. Basement provides for a laundry.



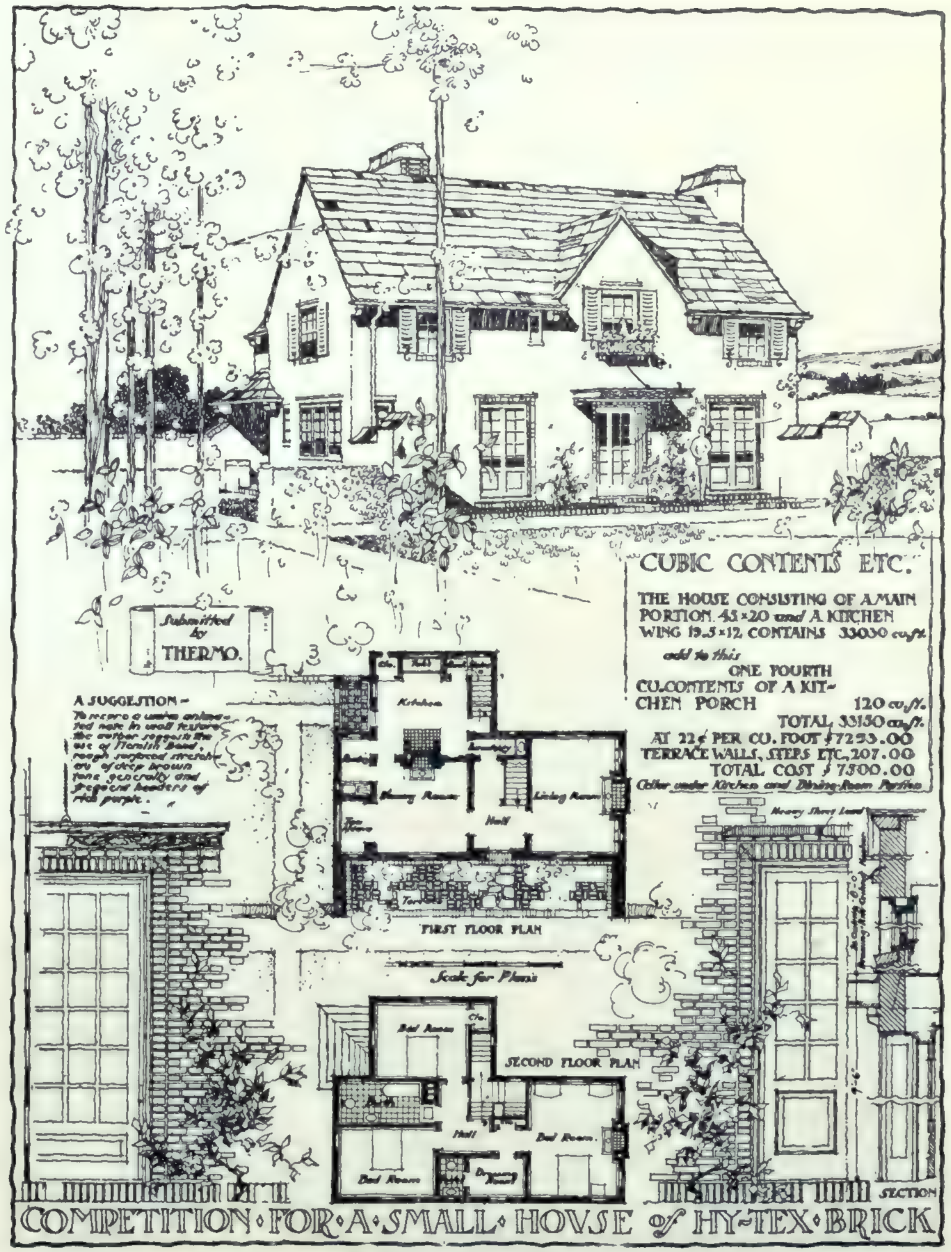
·FIRST FLOOR PLAN·



·SECOND FLOOR PLAN·



J. P. LORD, BOSTON, MASS.


CUBIC CONTENTS ETC.
THE HOUSE CONSISTING OF A MAIN PORTION 45×20 and A KITCHEN WING 19.5×12 CONTAINS 33030 cu.ft.
add to this
ONE FOURTH CU.CONTENTS OF A KITCHEN PORCH 120 cu.ft.
TOTAL 33150 cu.ft.
AT 22¢ PER CU. FOOT $7293.00
TERRACE WALLS, STEPS ETC. 207.00
TOTAL COST $7500.00
Cellar under Kitchen and Dining Room Portion
Submitted by THERMO.
A SUGGESTION –
Kitchen
Dining Room
Living Room
Hall
FIRST FLOOR PLAN
Scale for Plans
Bed Room
Bed Room
Bed Room
Bath
Hall
SECOND FLOOR PLAN
SECTION
COMPETITION FOR A SMALL HOUSE of HY-TEX BRICK

R. M. POWERS, BOSTON.

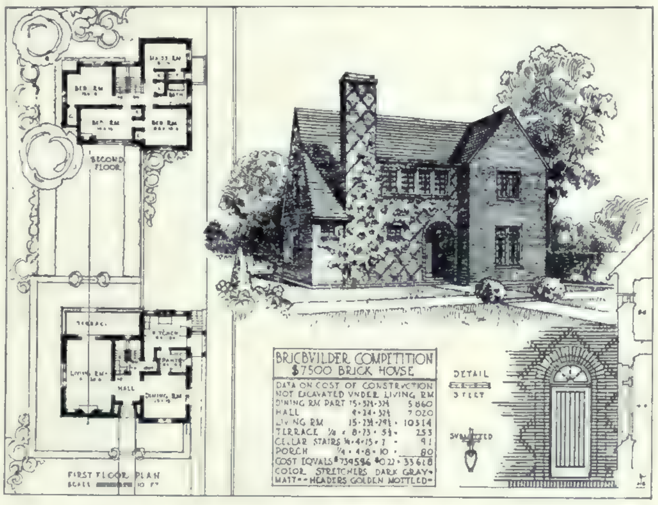
FIRST AND SECOND PRIZE DESIGNS.

COMPETITION FOR A BRICK HOUSE.

Competition for a Brick House to Cost $7,500*

REPORT of the Jury of Award: The problem was a detached house, faced with brick, to be built complete at a cost not to exceed $7,500, which would provide for the usual accommodations and conveniences of a small American family of moderate means. It was especially desired that the designs should show generous appreciation of good brickwork and to this end the programme covering this competition called for originality in the treatment of the wall surfaces and brick details. It was the aim of the competition to encourage the further development of a wholesome brick architecture in America.

It must be remarked that the difficulty of selecting the designs to receive prizes and mentions was great. There were nearly four hundred designs submitted and the task of elimination was one of no easy matter. Some interesting bits of real feeling in design were lost to recognition through weak presentation. The predominance of bitten off gable ends gave a notable evidence of striving for a feature at the expense of taste. A striking feature was the prevalence of the Dutch Colonial entrance hood—some eccentric, some weak, but most of them obvious and meretricious.


SECOND FLOOR
FIRST FLOOR PLAN
BRICBVILDER COMPETITION
$7500 BRICK HOVSE
DATA ON COST OF CONSTRVCTION
NOT EXCAVATED VNDER LIVING RM
DINING RM PART 15·32½·32½ 5860
HALL 9·24·32½ 7020
LIVING RM 15·23½·29½ 10514
TERRACE ½ 8·7½·5½ 253
CELLAR STAIRS ½·4·15·3 91
PORCH ¼·4·8·10 80
COST EQVALS $7595.96 @ 22 33618
COLOR STRETCHERS DARK GRAY MATT—HEADERS GOLDEN MOTTLED
DETAIL
LIVING RM
HALL
DINING RM
TERRACE

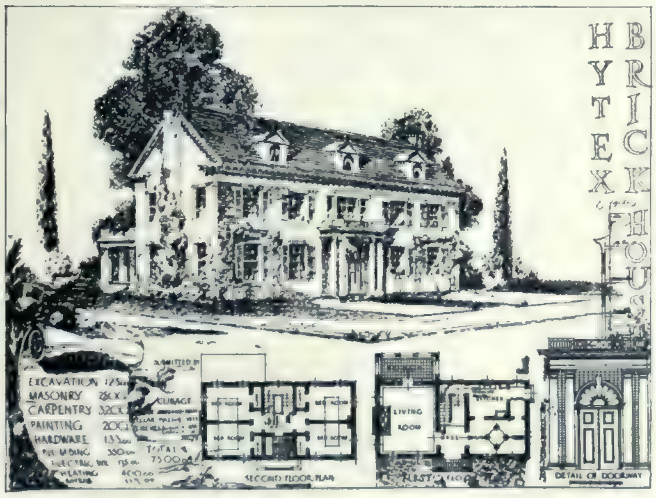
O. W. SHELGREN, BUFFALO, N.Y.

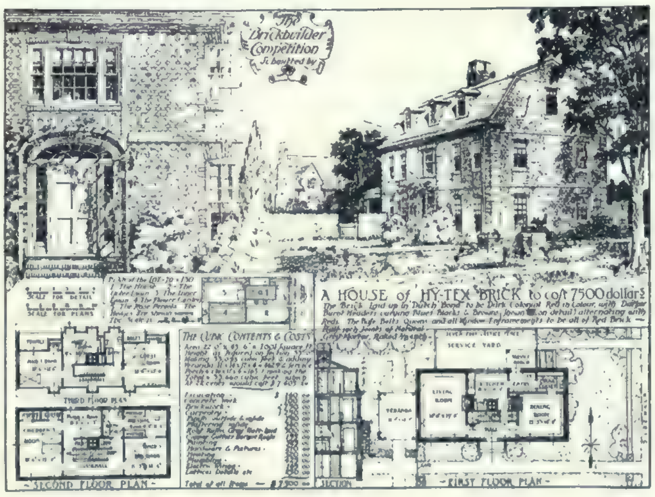
The jury gave first consideration to the design and its fitness to the material employed. Special attention was given by the jury to the plans. In several instances an otherwise acceptable design was passed by because of weakness in the study of the plan. It was recognized by the jury that good draftsmanship was essential to a good presentation of the subject, and therefore the rendering of the sheet was considered. Obvious copies of published work or of winning designs in previous competitions were rejected with some adverse comments.

The rendering and lettering of the design by R. R. Stanwood, of Boston, Mass., given a mention and shown at the bottom of this page, is notably charming and unusually meritorious.

First Prize.—While the jury in making this award found minor defects of plan, notably in the access to the staircase from the service portion, the small, picturesque mass of the design seemed best to fill the requirements of the programme, while ample opportunity is offered for the interesting development of texture in the brickwork under careful study of its fine wall surfaces. The fenestration is interesting and consistent in plan and elevations.

Second Prize.—A very consistent, well ordered plan, although not as adequately provided with porch room as is desirable. The elevation, charming in its simplicity, does not do justice to the brickwork

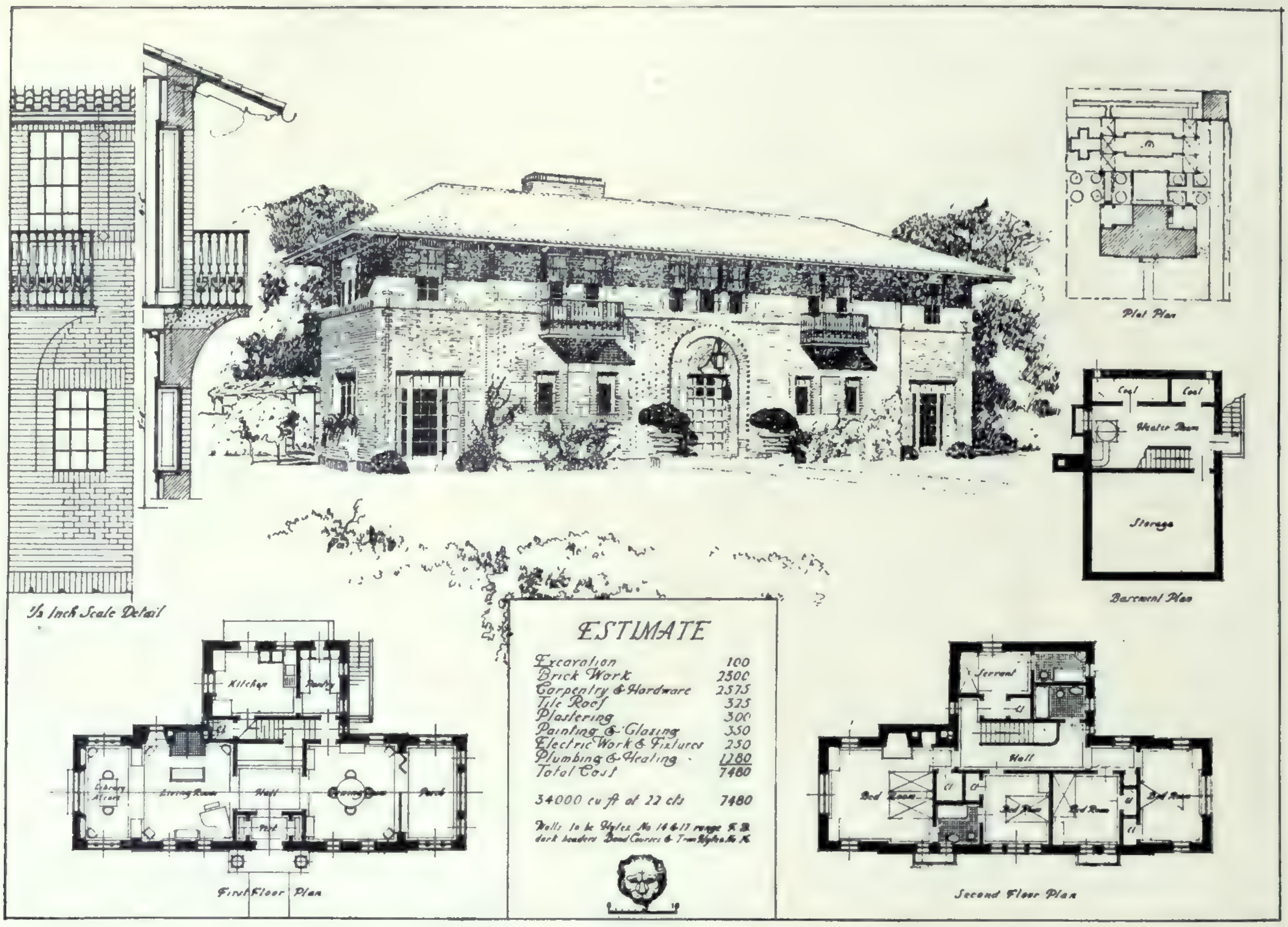




D. MCLACHLAN, JR., BROOKLYN. MENTION DESIGNS. R. R. STANWOOD, BOSTON.

---

*Held by "The Brickbuilder," Boston, Mass.



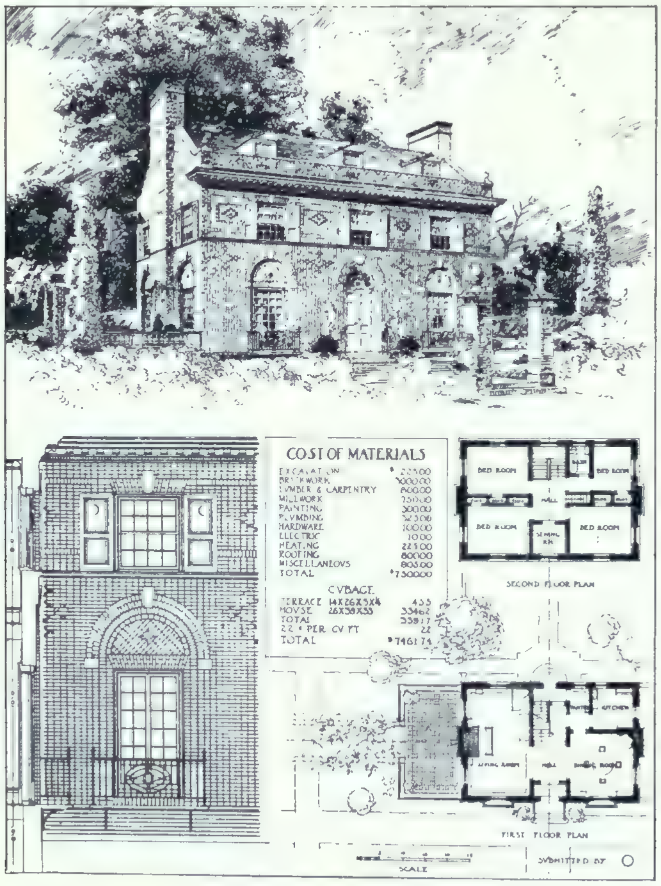
ESTIMATE

Excavation	100
Brick Work	2500
Carpentry & Hardware	2575
Tile Roof	325
Plastering	300
Painting & Glazing	350
Electric Work & Fixtures	250
Plumbing & Heating	1280
Total Cost	7480
34000 cu ft at 22 cts	7480

Walls to be Hytex No 14 & 17 range K.B. dark headers Band Courses & Trim Hytex No K.

FOURTH PRIZE DESIGN.

LELAND H. LYON, NEW YORK CITY.

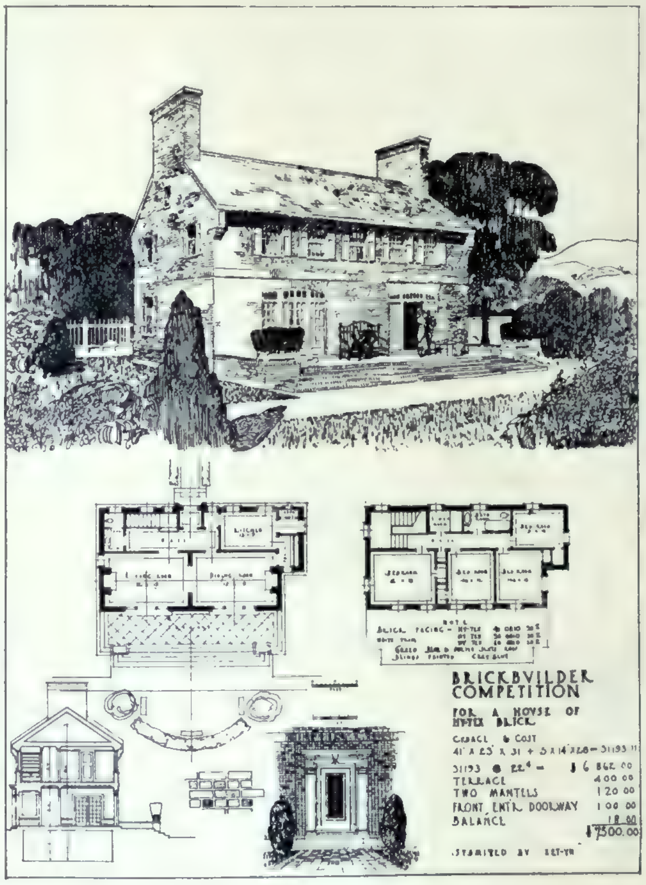


COST OF MATERIALS

EXCAVATION	$225.00
BRICKWORK	3000.00
LUMBER & CARPENTRY	1600.00
MILLWORK	750.00
PAINTING	300.00
PLUMBING	325.00
HARDWARE	100.00
ELECTRIC	10.00
HEATING	225.00
ROOFING	800.00
MISCELLANEOUS	805.00
TOTAL	$7300.00

CUBAGE

TERRACE	14X26X5X4	455
HOUSE	26X38X33	33462
TOTAL		33917
22¢ PER CU FT		22
TOTAL		$7461.74



BRICKBVILDER COMPETITION

FOR A HOVSE OF HYTEX BRICK

CUBAGE & COST

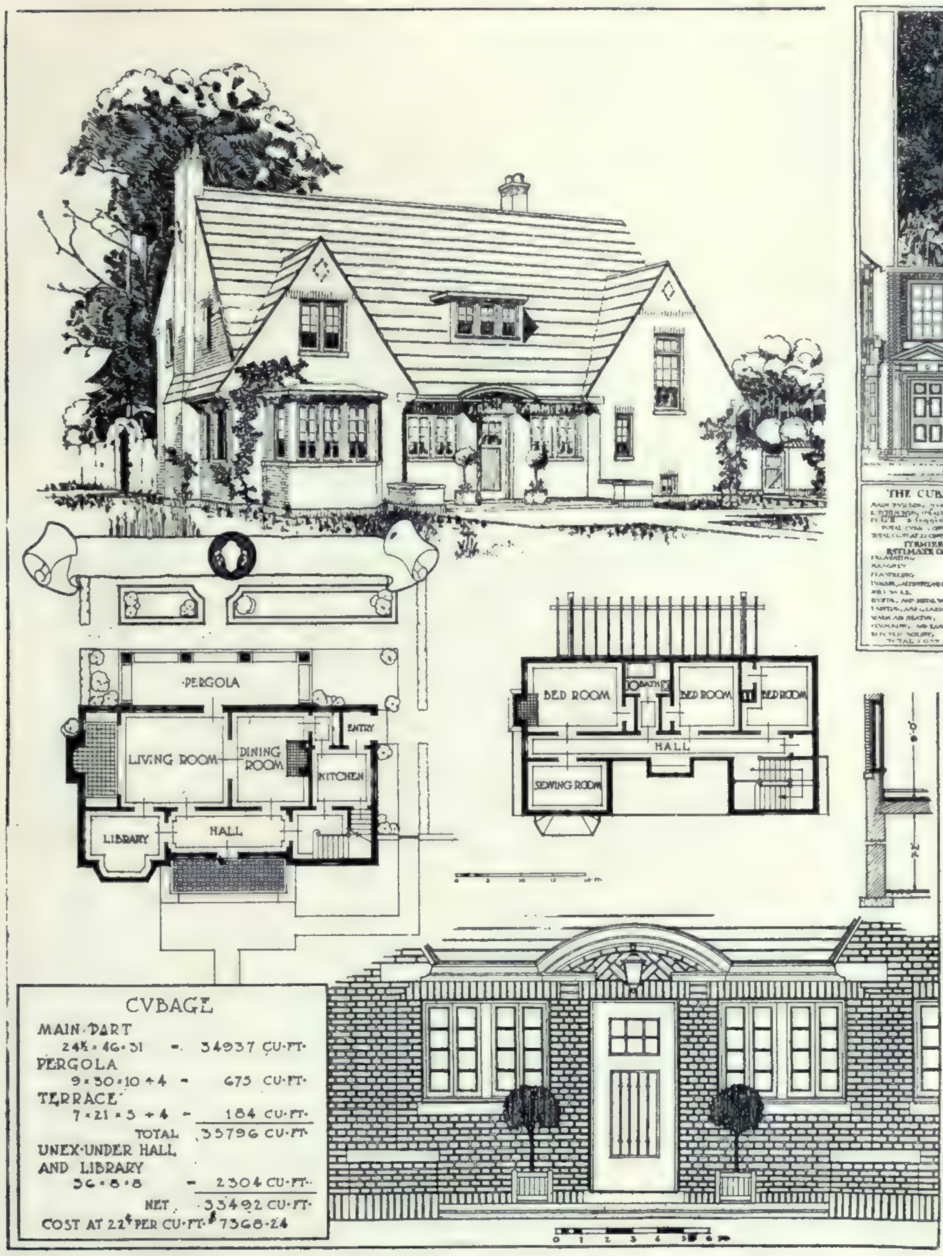
41' x 23' x 31 + 5 x 14 x 28 = 31193

31193 @ 22¢ =	$6862.00
TERRACE	400.00
TWO MANTELS	120.00
FRONT ENTR. DOORWAY	100.00
BALANCE	18.00
	$7500.00

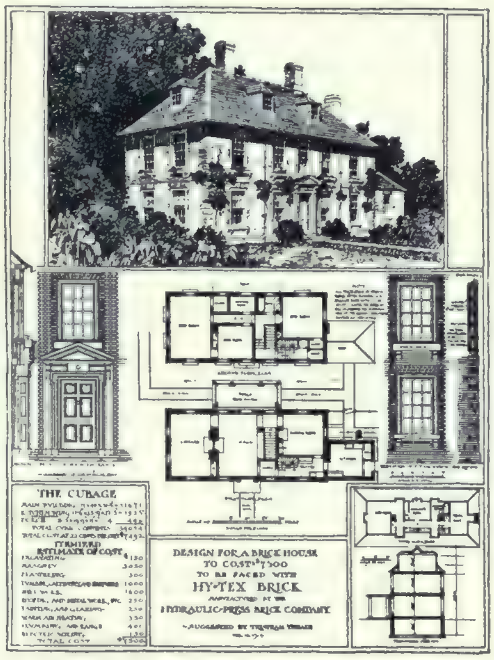
SUBMITTED BY SET-YN

A. DINARDO, NEW YORK. MENTION DESIGNS. D. RITCHIE, MONTREAL, CAN.

COMPETITION FOR A BRICK HOUSE.



THIRD PRIZE DESIGN. MURPHY & COLEAN, DES MOINES, IOWA.



MENTION DESIGN.

A. C. CASS, NEW YORK CITY.

as shown on the scale drawing. This well thought out scheme if shown on the perspective would have relieved this drawing from the first impression that it might be for stucco as well as for brick.

Third Prize.—This design has a delightful plan and a happy scheme of composition which might be made most attractive in execution.

Fourth Prize.—The greatest merit of this design is in its admirably balanced, well conceived plan and in a certain originality of design which is commendable and which would have placed it higher had it not gone a step too far in destroying the simplicity of the charming balconies with clumsy corbeling and the attendant evil of this feature interfering seriously with the fenestration below.

The six mention drawings are presented as of equal merit.

Arthur Heun, Chicago; Edwin H. Hewitt, Minneapolis; John L. Mauran, St. Louis; Frank B. Meade, Cleveland; W. D. Wight, Kansas City, were the Jury of Award.

Programme.—The problem is a detached house, to be faced with brick at a cost not to exceed $7,500. The style of the house and plan arrangement is left entirely to the designer; it should, however, provide the usual accommodations and conveniences for a small American family of moderate means. It is especially desired that the design should show generous appreciation of good brickwork, and in this connection originality in the treatment of the facing possibilities of the material is courted. The location may be assumed in a town, small city, or suburb of a large city. Shape and size of lot may be established arbitrarily by the designer; the land is level.

The cost of the house complete, exclusive of the land, must be figured at 22 cents per cubic foot. This price must include cost of excavation, plumbing, heating, electric wiring, hardware and painting, in addition to the other costs of materials and construction. Measurements must be taken from the outside face of exterior walls and from the level of the basement floor to the average height of all roofs, measured to a point two-thirds of the distance from the highest cornice to the ridge. Porches, verandahs, and other additions are to be figured separately at one-fourth (twenty-five per cent.), of their

CONSTRUCTION

A · JOURNAL · FOR · THE · ARCHITECTURAL
ENGINEERING · AND · CONTRACTING
INTERESTS · OF · CANADA

FREDERICK REED, Editor

H. GAGNIER, LIMITED, PUBLISHERS
Corner Richmond and Sheppard Streets,
Toronto - - Canada

BRANCH OFFICES:
MONTREAL—171 St. James Street
WINNIPEG, MAN.—13 Royal Bank Building
CHICAGO—People's Gas Building
NEW YORK—156 5th Avenue

CORRESPONDENCE.—All correspondence should be addressed to "CONSTRUCTION," Corner Richmond and Sheppard Streets, Toronto, Canada.

SUBSCRIPTIONS—Canada and Great Britain, $3.00 per annum. United States, the Continent and all Postal Union countries, $4.00 per anum, in advance. Single copies, 35c.

ADVERTISEMENTS—Changes of, or new advertisements must reach the Head Office not later than the twentieth of the month preceding publication, to ensure insertion. Mailing date is on the tenth of each month. Advertising rates on application.

CONTRIBUTIONS—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and duly returned.

Entered as Second Class Matter in the Post Office at Toronto, Canada.

Vol. VII Toronto, July, 1914 No. 7

COMPETITION FOR A BRICK HOUSE

(Continued)

total cubage, provided they project beyond the bearing walls, and at one hundred per cent. if provided for within the bearing walls. All cubage and other dimensions will be checked before the drawings are submitted to the jury. Those designs which exceed the limit of cost or which do not meet the other requirements of the programme will not be considered. The jury will give consideration first, to the fitness of the design, to the material employed æsthetically considered; secondly, to the excellence of plan.

Drawing Required.—On a sheet of white paper measuring exactly 26 by 20 inches with plain black border lines drawn one inch from edges, giving a space within the border lines of 24 by 18 inches, give a pen and ink perspective of the house, without wash or color, drawn at a scale of 4 feet to the inch; plans of first and second floors at a scale of 8 feet to the inch; a detail showing bond or other points of interest on exterior walls; enough detail sketches, including treatment of main entrance, to fill out sheet. In connection with the plan of the first floor show as much of the arrangement of the lot in the immediate vicinity of the house as space will permit. The plans are to be blocked in solid. Height of floors to be given on section. A graphic scale must accompany the plans. Very thin paper, mounted paper, or cardboard is prohibited.

Construction.—Methods usually employed in the construction of brick walls as to bonding, anchorage, etc., may be followed, the exterior walls to be wholly faced with brick.

* * *

A FOLDER of unusual interest comes from the Ceresit Waterproofing Company with points well presented in verse and illustrated by C. De Ball, cartoonist of the Chicago *Evening Post.*

* * *

OFFICIAL announcement is made by the Toronto Terminals Railway Company, of the award of the contract for the construction of their terminal buildings in the city of Toronto, to the P. Lyall & Sons Construction Company of Montreal.

* * *

"PARIAN" is the name chosen for the well-known line of illuminating glassware sold by the H. W. Johns-Manville Co. It was selected because of the close resemblance of the material to beautiful Parian marble, and even when unlighted is highly attractive.

* * *

Modern Alphabets is a booklet on general lettering which contains twenty-three styles, each one of which is on a separate page and consists of three sizes showing the complete alphabet in small letters and capitals. The numerals are also given. Published by Eugene Dietzgen Co., of Chicago and New York. Price, 25 cents.

"CERTAINTY"

is what is sought for by everyone. With the Architect and Engineer this is particularly true

The Dietzgen Instruments and Materials are manufactured in our own Factories under the discipline of establishing Accuracy and Dependability; always with the idea of the exacting purpose for which they are intended, and not simply as merchandise to sell—to co-operate and verify with exactness the thought behind their use.

EUGENE DIETZGEN CO., LTD.,
116 Adelaide St. W., Toronto.

CONSTRUCTION

August, 1914 Vol. 7, No. 8

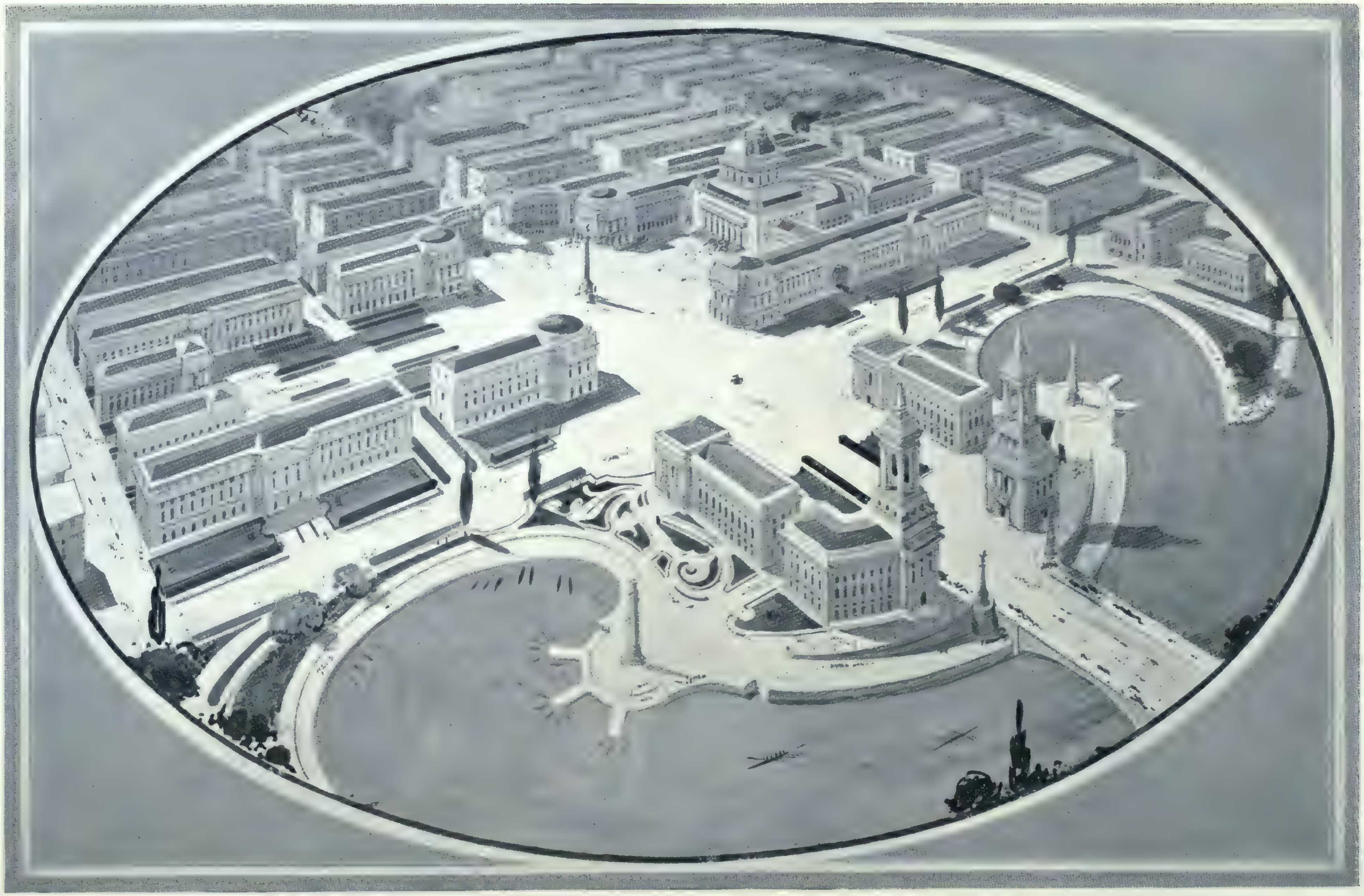
CONTENTS

EDITORIAL 311
Sixth National Conference on City Planning.
CERTAIN ASPECTS OF CITY FINANCING AND CITY PLANNING....... 312
PLAYGROUNDS 321
ELEVATED PLAYGROUNDS 331
CURRENT TOPICS 334

Full Page Illustrations

PROPOSED CIVIC CENTRE FOR CALGARY ....Frontispiece
GRAND CENTRAL RAILWAY TERMINAL 332

H. GAGNIER, Limited, Publishers
GRAPHIC ARTS BLDG., TORONTO, CANADA
BRANCH OFFICES
MONTREAL WINNIPEG CHICAGO NEW YORK



PROPOSED CIVIC CENTRE FOR THE CITY OF CALGARY.

EDITORIAL

Sixth National Conference on City Planning—Beneficial results already experienced by Canada—Personnel of the speakers and the bright outlook.

THE Sixth National Conference on City Planning, held in Toronto May 25-27, has already proven of great value to the various provinces in their effort to grasp the essential principles of civic improvement. The Alberta Town Planning and Housing Association in June drafted a bill for legislative consideration based upon the Town Planning Act as presented by the Commission of Conservation and discussed at the National convention. In July, James White was sent by the government to Europe in order to study conditions abroad and as a result introduce a better system of town planning in Canada. As Mr. White is chairman of the Conservation Commission which is at present assisting the newly formed Town Planning Association of Canada in drafting an act to be presented to all provincial legislatures for approval, surely some adequate and practical scheme will be forthcoming.

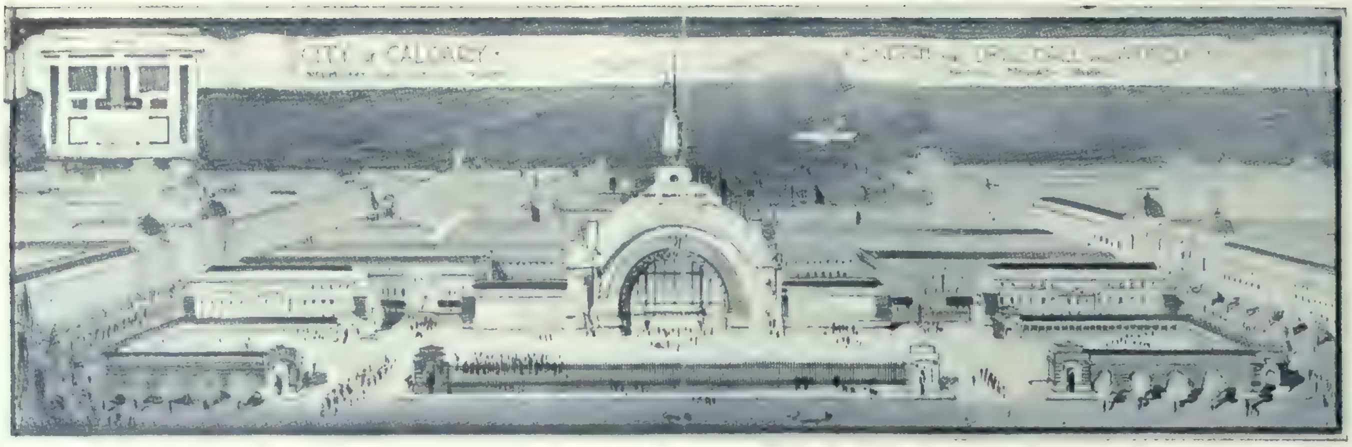
This Number of Construction is devoted to town planning, presenting some of the papers read at the convention along with views illustrating all phases of the work. Many of the photos shown were furnished by the Commission of Conservation and the "American City" which is a potent factor in the progress of this work in the States. As it is impossible to cover the entire field in one number a second issue will be used in this connection containing articles relative to certain essential phases touched upon at the conference.

In welcoming the two hundred and seventy-five delegates the Hon. Clifford Sifton, Chairman of the Conservation Commission, impressed upon each one the necessity of enlightening the people with the fact that city planning does not result in wasting money, but rather provides a means of avoiding extravagance. Mr. Sifton in referring to unsanitary and slum conditions which follow increasing wealth and progress, pointed out, that although there are all sorts of remedies suggested, Socialism, single tax, etc., none of these would radically alter the law that poverty follows in the wake of increased prosperity in a nation. It was suggested that the time had come to call a halt in the expenditure of an extravagant kind on public buildings, wasteful lighting systems and the general ostentation of cities in order that the destitution which is growing up alongside might be faced. Rational city planning he felt would do much to cure the present evil conditions, and the real problem up to the intellect of the twentieth century is whether we are big enough to grapple with these present evils.

His Royal Highness the Duke of Connaught in addressing the convention spoke of city planning as among the most pressing of the many problems which confront the public men of today. He cited the danger of a haphazard growth so prevalent in European cities; and urged the proper handling of housing and sanitary conditions forced upon us by the constant flood of immigrants. He also cited the urban question as one in which prevention is far more effective than cure, since a vicious system firmly established with vested interests growing round it, will be uprooted only through a lengthy controversial and desperately expensive process. His address closed with three suggestions: The need of provision of ample park and playground space, the creation of main arteries of communication in cities, and the securing of proper and adequate housing conditions for the increasing urban population.

One of the most inspiring and memorable occasions during the entire conference was at the closing banquet. The keynote of each toast seemed to be the need of a general awakening of the people to the economical investment in expending money on wholesome city planning. Thomas Adams, head of the Town Planning Department of the Local Government Board in England, said that little progress could be made unless the schemes were founded on the will of the people. He stated that the idea was no illusion, no dream of a few sentimentalists, but was something aimed at the removal of disabilities which bad management had brought about.

The altruistic motives centered in the work of so many men will bring about a condition wherein the unwholesome and unsanitary state of the present cities will be a matter of history. The wild growth of a careless past will be changed at a tremendous cost and the new plans will conform to the fundamental principles of beauty, health and economy.



Certain Aspects of City Financing and City Planning

ANDREW WRIGHT CRAWFORD, ESQ.

THE genius of modern life is to do justice; and yet there is hardly a municipal bond issue by which injustice is not done. Bonds are issued to pay for the construction of things that will not last for the life of the bonds. Thirty-year or fifty year bonds for street paving, which will have to be completely replaced in ten, or, at most, fifteen years, are constantly authorized. The taxpayers for the last fifteen years of the life of the bonds, in cases where they are to run for thirty years; and the taxpayers of the last thirty-five years, where the bonds are to run for fifty years, are thereby compelled to pay interest and sinking fund charges for a thing which they cannot by any possibility enjoy.

This injustice is not confined to things that are completely obliterated before the end of the life of the bonds. The more common, though less glaring, manifestations of it are in the inadequate conception or execution of municipal work to be paid for through bond issues. All kinds of public undertakings are conceived, either with reference only to the needs of the present or of the immediate future—of not more than the next decade. Fifty year bonds are issued to pay for improvements which will be quite inadequate fifty years hence, and which will have to be greatly enlarged in capacity long before they are completely paid for through the amortization of the bonds. While a part of the original construction may be useful in the enlargement, frequently all of it is useless and the cost of its removal makes the total cost greater than if unoccupied ground were available. Thus under-planning entails avoidable expense and is therefore extravagance.

Failure or inability to foresee or want of courage to act in accordance with true vision is responsible for this waste in American municipal expenditures.

It is submitted that no issue of municipal bonds should be sought by city officials, unless the thing to be constructed by those bonds will last as long as the bonds themselves, and, further, unless it will be measurably adequate for the needs of the community at the end of the life of the bonds as well as at its beginning.

The administration that is not consciously and conscientiously endeavoring to foresee and measurably to provide for the needs of the future should be confined in its expenditures to the income of the present.

I have referred to thirty and fifty year bonds. As it is becoming the fashion to authorize the issue of fifty year bonds I shall hereafter refer to fifty year bonds, noting now that what is said in regard to them is generally applicable to thirty year bonds also, with an obvious reduction in proportion or in emphasis.

American cities double in population in twenty-five years. A city of 100,000 to-day will be 200,000 in 1939. This means that by 1964 it will have doubled again and be 400,000, a population four times that of to-day. This obvious result is not so obvious to the official who is thinking only of the present. I recently saw a computation of the future population of a city made by a newly appointed Secretary of a City Planning Commission, in which he took the total growth of the last fifty years and assumed that the total growth of the next fifty years would be exactly the same. He assumed that the absolute figures would be the same, not the percentage. "Dealing in futures" has heretofore been a little known art in municipal operations. The figures given above show that in fifty years the average American city will quadruple in population. The logical conclusion follows, that if the thing now constructed by the proceeds of the sale of fifty-year bonds, is to be commensurate with the needs of the people who in the latter years of the bonds' life will be making use of that thing, and also paying interest and sinking fund charges thereon, the needs of a population approximately four times the present one must be considered if for no other reason than to avoid the doing of palpable injustice.

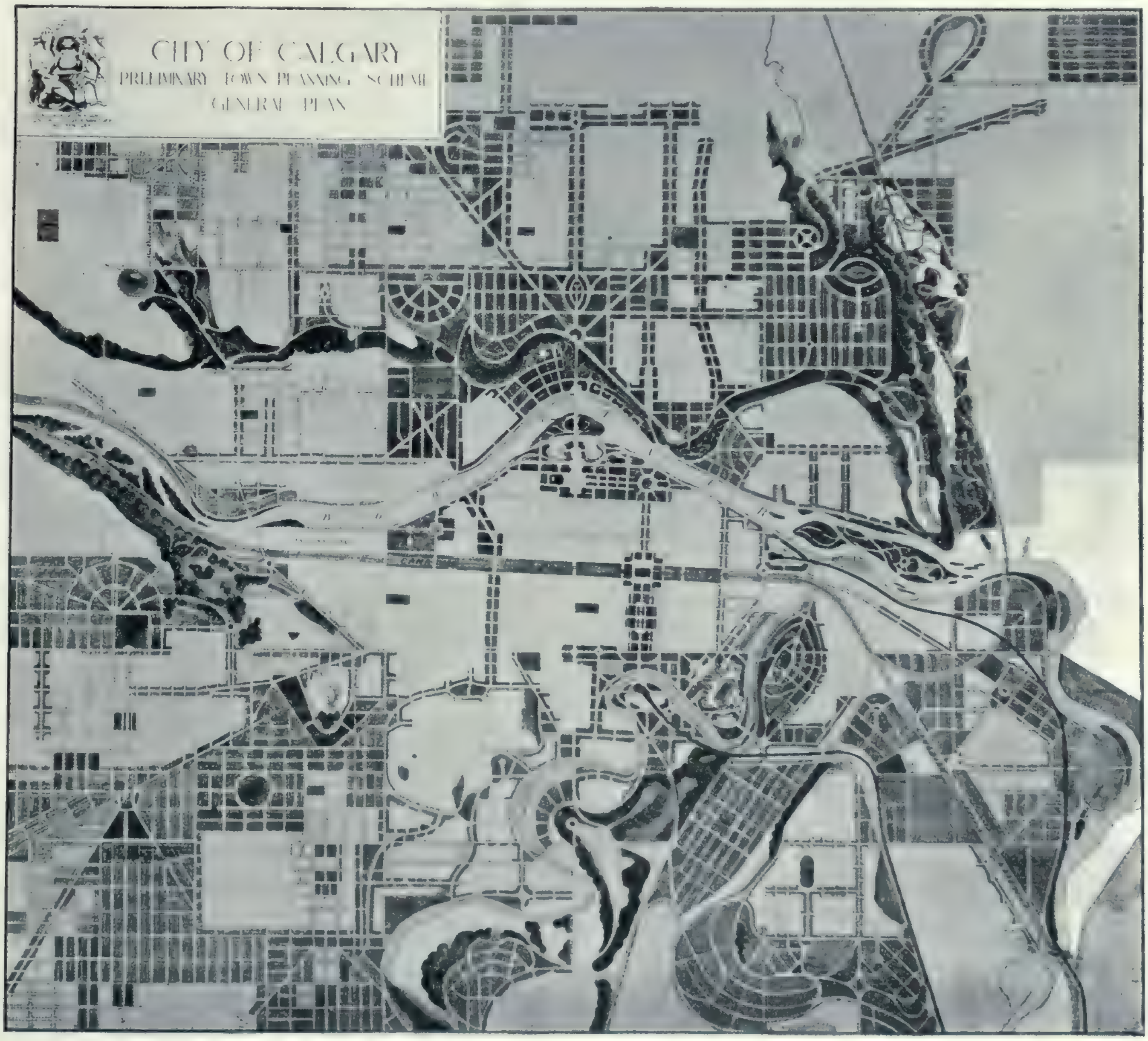
The efficient life of the thing constructed by the proceeds of municipal bonds should measure their term, that efficiency being measured by adequacy of service to the community, and city planning is indispensable to determine that length of efficient life of a municipally constructed thing. Hence the issuance of city bonds calls for city planning as a prerequisite.

I have purposely qualified the duty of to-day in this regard as being that of providing "measurably" for the needs of fifty years hence. To provide absolutely for such needs would compel us in 1914 to provide, and to pay proportionately for, a thing four times greater in capacity than required by us who have approximately but one-fourth the financial resources of 1964. That would be injustice to ourselves. How shall be adjust this difficulty? How shall we equitably provide payment for things needed now in a measure, which will hereafter be needed in the same, or a greater, or, conceivably a smaller measure? This question will find an answer to some degree in a differentiation among the things constructed by the proceeds of municipal bonds— a differentiation of which I give examples, not a catalogue.

In the case of outlying parks, we, who secure them, should pay the minimum. Fifty years hence these parks, now suburban, and now somewhat of a joyous luxury, will be indispensable to their urban neighborhoods. We should be able to issue bonds for such parks with a very small sinking fund charge to-day, graded up to a large charge fifty years hence—more: we should make park bonds run 75 or 100 years and make their present amortization charges negligible.

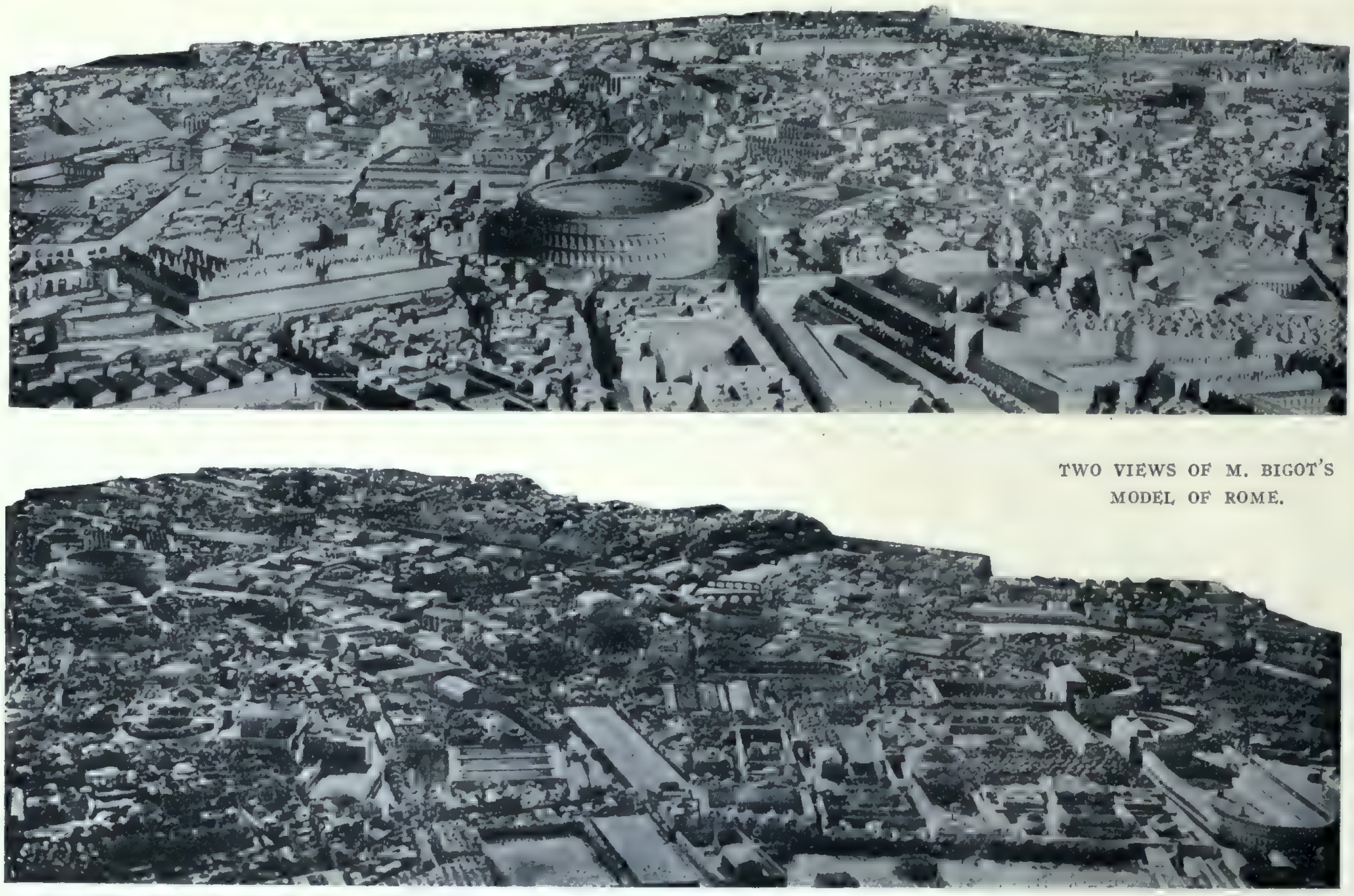
The term of paving bonds should be in the neighborhood of fifteen years and the immediate amortization charge should be very heavy—the charge fourteen or fifteen years hence very light. We who have the pavement at its finest should pay the highest toll.

Stone and concrete bridges are expected to last for seventy-five years. Bonds issued to



provide the money for them should run as long. It is more difficult to determine whether their amortization charges should be graded up or down, or kept at one figure throughout. In the case of centrally located bridges, perhaps the last course would be advisable. In the case of bridges in suburban territories, their future greater usefulness justifies a heavier future sinking-fund charge.

The system of main sewers may deserve a diminishing amortization charge — of main streets, an increasing one. Public buildings probably deserve a diminishing charge throughout—though possibly the summit of their serviceableness is neither at the end nor at the beginning of the life of the bonds issued for them, but at some period during that life—probably nearer its beginning than its end;—the deterioration of the physical building must be considered and deterioration begins at once.



TWO VIEWS OF M. BIGOT'S MODEL OF ROME.

On the other hand bonds issued to provide funds for the acquisition of the real estate upon which public buildings are to be erected, clearly deserve an increasing amortization charge throughout. The division for taxation purposes, of land for improvements thereon, will show how markedly the former often increases in value while the latter decreases.

Each other city improvement should be considered likewise.

It is true that some of these suggestions would require changes in State constitutional provisions before they could be carried out. But if city planning should contemplate a minimum of fifty years for physical results, a minimum argued for hereafter, a delay of four or five years in order to secure constitutional changes is not of paramount importance. Moreover, while the inquiry as to present legal capacities is obviously an important part of a city survey, city planning must necessarily contemplate changes in organic law from decade to decade; it is a part of city planning to plan future laws as well as future structures. Constitutional provisions and acts of legislatures will change during fifty years anyway; there will be much gain if they are planned to meet city planning requirements paril passu.

The desirability of providing for graded amortization charges, though a constitutional charge is involved, has been recognized. One example of which there are doubtless others, may be found in a proposed Amendment to the Constitution of Pennsylvania, which passed the last Legislature but which will have to pass the next Legislature and then be ratified by the electors. The Amendment is to enable the city of Philadelphia to borrow three per cent. over the existing limitation of seven per cent. "for the construction and improvement of subways, tunnels, railways, elevated railways and other transit facilities; for the construction and improvement of wharves, and docks, and for the reclamation of land to be used in the construction of wharves and docks, owned or to be owned by the city," and it provides, in part: "In incurring indebtedness for any one or more of said purposes . . ., the city of Philadelphia may issue its obligations maturing not later than fifty years from the date thereof, with provision for a sinking-fund sufficient to retire said obligation at maturity, *the payments to such sinking fund to be in equal or graded annual installments.*"

It may be noted in passing that this amendment follows the admirable precedent already established in other states of providing that the borrowing capacity of a city at any time is to be ascertained by excluding from the calculation a credit where the work resulting from any previous expenditure of loan moneys is self-supporting.

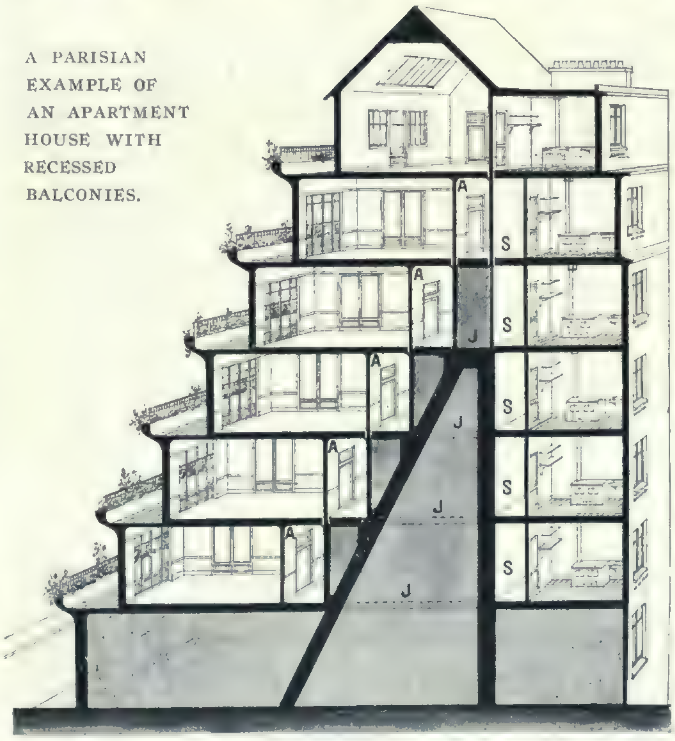
Obviously, all of these methods of municipal financing and each of these differentiations among its objects require the careful study, forethought and provision that are of the essence of city planning; they necessitate city planning, if they are to be more than guesses.

It will not have escaped you that any consideration of municipal bonds in connection with city planning establishes the minimum for the time that should be contemplated in city planning. It does not necessarily establish the maximum. But the minimum usually is in practice the maximum. In Pennsylvania just before the enactment of the minimum wage law, its opponents sought the support of a manufacturer who was known to pay the lowest of low wages, and they asked him: "Do you believe in the minimum wage?" To which he replied: "Sure I do; I pay it!"

If the needs of the population at the end of the life of bonds, fifty years hence, must be considered as a mere matter of justice, obviously, our city planning must contemplate fifty years as its minimum: if in practice that does become also the maximum, I am not satisfied that any harm will result. Think of the inventions or improvements in inventions made during the last fifty years, especially those affecting communication—the telegraph, the telephone, the electric car, the motor car, the motor truck and the German dirigibles—to suggest a few—and I think you will agree with me that it is enough to attempt to forecast the needs of an urban population four times that of to-day.

A striking example of changes in the problems we have to deal with in city planning was brought out by a report at the meeting of the Third International Road Congress at Ghent in 1913, which Mr. S. D. Adshead thus abstracts:

"A census of traffic taken on a fine Sunday afternoon in the spring of the present year on a certain secondary arterial road leading out of London, showed that the average number of vehicles passing in one hour was: Motor buses 50, motor cars 300, motor bicycles 50, bicycles 100, and horse-drawn vehicles 15. A fair presentation of the Saturday and Sunday crowd.



A PARISIAN EXAMPLE OF AN APARTMENT HOUSE WITH RECESSED BALCONIES.

"This particular section of the road chosen for observation was straight for about one-third of a mile and had no cross roads. Deviations in its alignment at either end prevented excessive speed, but a computation showed that motor buses attained an average pace of

FOUNTAIN IN MADRID.

14 miles per hour and motor cars 25. It was a narrow road, being only 26 feet in width between the curbs, but it has a fine surface of wood block which has been recently laid.

"Ten years ago it was paved with macadam and at the same time of day and on the same day in the year it would have been traversed by a continuous procession of cyclists, a few horse buses and other horse traffic of a lighter kind. Twenty years ago it was a carriage drive, a route for agricultural wagons and light tradesmen's carts, and it also provided a means of access to the metropolis for those possessed of a horse.

"The changes in condition of usage which have overtaken this secondary arterial road leading out of London apply with equal force to road leadings out of every town of importance in Europe and America."

As in the period of twenty-five years the average city doubles in population, and as the terms of administrations of city officials are becoming generally four years it follows that each administration will see a growth of the city approximating the proportion of four years to twenty-five years, 12 per cent. to 15 per cent. In some cases it will be less; in others more. But each administration must prepare for a growth of upwards of 15 per cent. that will occur in the city's size during its term. This will be reflected chiefly on the city's perimeter but it will react also on the city generally, on the central portion especially and on the subcentres intermediately. The more intensive future use of the portions of the city already built requires our present more extensive preparation. Each administration should at least take care of the additions to the physical requirements of public service that will become needed during its term of office.

LUXEMBOURG GARDENS, PARIS.

Municipal work may be divided into two grand divisions; one, the maintenance and operation of the existing municipal plant; the other, the planning and construction of additions thereto, and the re-planning and reconstruction of portions of it. In respect to its plan, the commonly accepted analogy that a city and its citizens resemble a corporation and its stockholders fails to be true, and hence is misleading. An ordinary corporation can stop its growth, if its directors or stockholders determine that it shall do so. The growth of the municipal plant cannot be stopped.

The maintenance and operation of the existing plant, to which the attention of municipal officials has been so largely given heretofore, is unquestionably of immediate and pressing importance, but the expert skill and knowledge required for planning for the growth of the city that will take place each year, each ten years and each fifty years is of a higher order than that required for maintenance and operation. Just as it takes a higher degree of expert knowledge and skill to plan and build a house than to make repairs to it afterwards, so it requires a better understanding of the problem, a more expert solution and more efficient construction work to plan and build the additions necessary for the future growth of the city, than to maintain and operate what has already been constructed. It used to be said that a carpenter could build a house and he didn't need an architect to tell him how to do it; many cities have been built, and some are still being built by similarly self-satisfied municipal carpenters. It ultimately costs more money to correct a house badly planned or skimped in its construction, than to build it right in the first place, and it costs the city vastly more to reconstruct itself, where it has been planned on wrong, mean or short-sighted lines, than to construct it well on broad lines, in the first place. And the direct money cost is not the only cost. John Burns well said "mean streets make mean people"; and we may paraphrase the remark by saying that mean city planning makes a mean city, and a mean city makes mean citizens.

City Planning, which has to do with all the elements that make up the physical city, involves not only planning but decision. The study of the one and the exercise of the other are as important duties as any to which a municipal administration can give its attention. During the course of any one day, or any one year, or any five years, this may not appear to be true; if the city were sure to cease to exist with the expiration of any such period, it would not be true, but, considering the entire future life of the city, not the dead past nor the fleeting present, but the far reaches of the future, it is true.

Fortunately the resources of a city increase with its needs. Failure to appreciate the fact that the annual income from taxation will be larger and the annual addition to the borrowing capacity of the city will be greater with each succeeding year, is the reason why the larger and larger plans prepared annually appear to be exceeding the capacity of the city. Our present plans, if they are to be adequate when materialized in the future, must be correspondingly extensive, based on an understanding not only of what the needs of the future will be, but of what the financial ability of that future will be. It is difficult to persuade people that any plan to be carried out in twenty-five years, for which the present capacity of the city is sufficient, is to be regarded because of that fact alone, as probably inadequate, as probably providing for a result at the end of those twenty-five years that will not be commensurate with the existing needs; the sufficiency of the present capacity of the city to finance the plan throws the burden of proof on its proponents to show the enduring sufficiency of the plan itself.

GARDENS OF THE TUILLERIES.

Certain of the more direct financial considerations that have to do with city planning have been discussed at these conferences. The method of paying for various kinds of improvements through assessments on the property benefited, has been emphasized as an admirable American method, where the sole question is how to finance a municipal improvement. The method of excess condemnation, where, in addition to providing, in whole or in part, for the cost, it is desired to exercise some control of abutting property, as by the regulation of occupation, the recasting of lot lines, the determination of lot and building widths and depths, the determination of minimum, maximum and proportionate heights of buildings, the regulation of the relation between buildings on adjoining lots, the prohibition of blind walls — again a suggestive list, not a catalogue—has been urged as a European method desirable and, if these ends are to be obtained, necessary for adoption here. Considerations of expediency will determine which method is the more available in individual cases. Generally, in undeveloped sections, assessment for benefits is the better method, while in developed sections, excess condemnation is preferable.

FOUNTAIN IN COLOGNE.

It should be borne in mind that where the power of excess condemnation is used, any loss as well as any gain will be the city's, whereas in the case of assessments for benefits, the loss, if loss there be, will be the property owner's. Greater justice is thus often secured by excess condemnation.

Frequently, the combination of the two methods will be advantageous: to condemn immediately abutting property to a desirable lot depth and control its development by the creation of easements, will spread the resulting increase in values over a greater territory than if such abutting property were left uncontrolled in private hands. Immediately adjoining the excess area so condemned, there will be consequently an enlarged area subject to assessment for benefits. And, in addition to the returns, in the one case, from the sale of the excess property, and, in the other, from the special assessments, both areas will therefore return annually a larger sum in taxes than before, thus taking care of proportionate interest and amortization charges on bonds that may have been issued to finance the work; or, if no such bonds were issued thus securing a greater income for general municipal uses. The territory actually feeling an increment in value will exceed both areas.

In his admirable paper entitled, "Paying the Bills for City Planning" delivered at our Boston Conference, Mr. Nelson P. Lewis showed the justice of assessing the cost of rapid transit systems on the properties within their spheres of influence. A recent Philadelphia investigation confirmed the experience of New York City in this regard, by showing that a newly constructed rapid transit line so concentrated the normal general increase of the entire residential areas of the city within its own sphere of influence, as to cause an actual loss for six years in all the other residential areas combined, despite the erection of some 21,000 new houses in these other areas.

PERSPECTIVE OF THE PUBLIC BUILDINGS OF CLEVELAND.

These experiences enable the exercise of municipal economy in another important respect.

Before a city proceeds to the undertaking of the construction of such lines, or before it permits their construction, the city should acquire the real estate it will need for all public purposes, whether for parks, playgrounds, parkways, street, school-houses, police and fire stations, public libraries or what not, in the territory that will be tapped; otherwise, if it waits until it has enormously increased the value of such property and the amount, therefore, which it will have to pay, it will be guilty of rank folly. Elementary prudence dictates action before this unearned increment has actually accrued—unearned, that is, by the owners' money, but earned directly by the city's expenditure of money paid by the taxpayers, where the city constructs the system; and this increment begins long before completion of the new lines. City Planning enables the exercise of similar far-sighted economy by present-day expenditure, in many respects other than the rapid transit system—parkways, other main thoroughfares, parks, river front improvements—in fact in the case of every public work where real estate, increased in value by its proximity to one public work, will be needed for another municipal service in the reasonably new future.

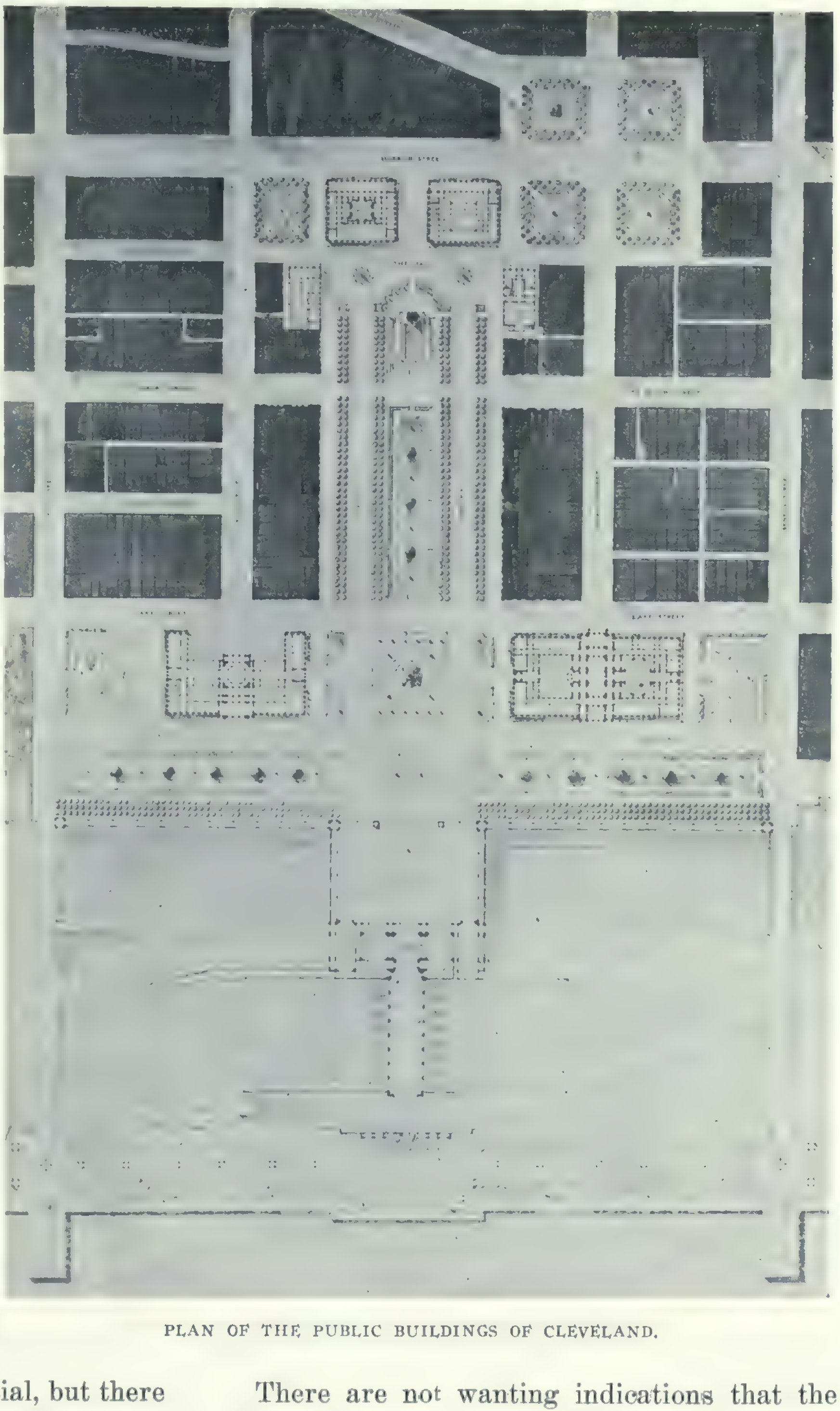
It will be observed that I am not here insisting upon the effect of the opening of parks, for instance, on adjacent land values. I am taking it for granted that there is no longer need of persuasion on this point: such testimony as the following: During the sixteen years following the laying out of Central Park, the average increase in the assessed value of real estate in the other parts of the then City of New York was about 100 per cent., while in the three wards then adjoining the new park, the increase was approximately 800 per cent.—has been duplicated in greater or less degree so often, that we are now able to exercise more far-sighted economy. Prompt expenditure is often the truest economy.

The broad financial aspects of city planning are frequently so general and illusory, so in-capable of mathematical demonstration, that they have not been appreciated in America at anything like their financial worth to the community.

The manifestations of this monetary benefit fall naturally into two classes, namely, the benefit to citizens through the attraction and circulation of outside money, the magnetic cause of which is to be found in certain city-planning works; and the benefit to the city treasury in the addition to the city's annual income caused by higher assessments for taxation purposes of properties within the spheres of influence of such works. As an example of this lack of appreciation of opportunities, consider the great sum annually lost by American treatment — if utter neglect of glorious opportunities can be called "treatment"—of their municipal river banks? Think, first of course, of the beauty and attractiveness of European water-fronts, the Thames embankment with the Hotel Cecil and other high-class properties crowding to its edge; the Seine; the hundreds of other European city rivers; and then, secondly and soberly, and in your counting-houses, compute the municipal money value of those works: in your calculations, assess the actual values of the properties fronting on the Seine, and compare them with what they would be if the Seine looked like the Chicago River; or the Schuylkill below Callowhill Street in Philadelphia; or Jones' Falls in Baltimore, or the Anacostia Flats in Washington. Compare the actual values of the properties fronting on the Thames embankments with what they would have been if that river's banks looked the way they did at the beginning of Queen Victoria's reign. Then apply your tax rate to the differences and you will get an index to the primary loss caused by our American ignoring of the scenic value of river fronts. I am emphasizing the municipal value of riparian developments mainly non-commercial, but there is a spirited, kaleidoscopic, fascinating scenic value and, hence, financial value, to the municipality in commercial waterfronts developed by masters who seek by-products as well as direct results.

So far, of the loss to the city; now of the loss to the citizen.

Compute the value to the citizens of European cities of their river-fronts. How much money would Parisians *not get a chance at,* if their river were as dilapidated, as uglified as ours are generally? The sums left by visitors to Paris each year are variously estimated from $50,000,000 up to several times that sum. How much would Parisians lose if the Seine were not a gigantic work in sculpture?



PLAN OF THE PUBLIC BUILDINGS OF CLEVELAND.

There are not wanting indications that the financial value of a beautiful thing to the community as individuals as well as a municipal corporation is becoming more widely appreciated. In a recent decision concerning the Fairmount Parkway, Judge Sulzberger, of the

PALAIS ROYAL, PARIS.

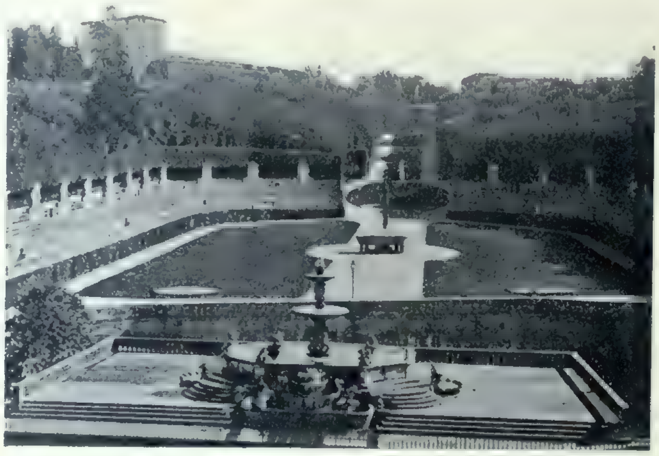
FOUNTAIN AT VERSAILLES.

Court of Common Pleas of Philadelphia County, said that such a feature "has an effect directly utilitarian. It increases the attractiveness of the city, induces strangers to visit it, and thus enlarges trade and commerce."

It is a pleasure to note that we are beginning the redemption of our water-fronts. Boston has begun it—true, in a hesitating, apologetic way, so as not to offend Beacon Street!—still it has begun it. You, here in Toronto, promise to do vastly better. Your combination of a commercial and non-commercial development promises to set the precedent for American cities that has been needed so long. The early realization of your plans is therefore a matter of financial concern to practically every American city.

If beauty pays, how much does ugliness cost? Do we realize how dearly we are paying every year for our investment in rectangular, gridiron schemes of unattractiveness? City treasuries are losing money and citizens far more. Let us never forget, when discussing parkways, river embankments, park and playground systems, group plans and other physical developments, that there is another side to the picture, the side of the city without parkways, without river embankments, without parks and playgrounds, without civic centres—the city crowded with overhead wires, with its sidewalks covered by overhanging, threatening signs, the curbs lined with ugly street fixtures. Which pays? Which costs?

PUBLIC FOUNTAIN IN DIJON.



BOBOLI GARDENS, FLORENCE.

Justice Requires City Planning Before City Bonds Issue.—It is injustice to issue municipal bonds to secure the money to pay for an improvement that will be obliterated before the end of the life of the bonds, e.g., to issue 30-year or 50-year bonds to pay for paving that will not last over 15 years. This compels taxpayers of the last years of the bonds to pay interest and sinking fund charges on bonds for a thing they cannot possibly enjoy. It is a similar injustice to issue such bonds for an improvement that, while it may physically last the term of their life, yet is conceived only to meet the needs of the citizens who are paying taxes at the date of the issuance of the bonds, and is not adequate for the needs of the citizens who will be taxpayers toward and at the date of the retirement of the bonds.—*Andrew Wright Crawford.*

Playgrounds

The Size and Distribution of Playgrounds and Similar Recreation Facilities in American Cities

HENRY V. HUBBARD*

CITY PLANNING, as we now understand it, is an attempt to create a complete and satisfactory environment for the inhabitants of cities. It is only within recent times that cities have made any attempt at being perfect, complete organisms. Up to a short while ago they were, as Dr. Hegemann says, not places to *live* in, but places to *die* in. Few families of city dwellers lasted beyond the third generation. If the country had not supplied new recruits, the city would have perished. Obviously there was a lack of some element necessary for man's complete and permanent existence. Dr. Cabot, in his recent book, "What Men Live By," enumerates the necessities of man's existence as work, play, love and worship. The completely organized city should provide for all four of these requirements. There has certainly been no lack of work, although the way in which this work is to be done is still very much the concern of the city planner. Family life and religious life are of course also his concern, but not the subject of this discussion. Play, an absolute requirement for efficient and continued human existence, is, of the four essentials, the thing for which least municipal provision has been made in cities, and its lack was first felt and first provided for by those who tried to make our modern cities fit for their inhabitants.

Recreation is essentially mental or physical relief from any exhausting activity or environment. In our modern cities this exhaustion has been, of course, mostly the result of work and of the confinement and repression incident to the existence of large bodies of men in wholly man-made surroundings. Men's recreations are different as men's work and environments are different; that is, each man's recreation will be relief from his own particular form of exhausting activity. In our crowded cities, however, all people are alike subject to certain exhausting forces: the tenseness of their struggle for a livelihood and the restriction of their man-made surroundings. It was natural, therefore, that the kind of recreation which was first seen to be needed was leisure, openness of surroundings, room to walk and to breathe and a chance to see trees and grass instead of bricks and mortar. Our first public recreation facilities were, therefore, parks.

But these parks, even when sufficient for this particular demand, did not meet all the requirements. As we have come more and more to see the sound sense of providing outdoor recreation facilities, and as cities have been more and more willing to withhold land from the obvious utilities of business and residence for recreation purposes, cities have acquired—beside considerable areas of the countryside reserved for the use of the citizens—smaller parks for more intensive use, athletic fields, playgrounds, neighborhood centres, small resting places, swimming pools and other such specialized provisions for outdoor recreation. Some indoor recreations also have come to be carried on by the municipalities, such as public baths, gymnasiums, libraries, museums and social centres. Of course, there has been, too, commercial provision by private agents for any kind of recreation which could be made to yield profit to private investment. Theatres we have always had; moving pictures, penny arcades, amusement parks, dance halls, skating rinks, bowling alleys, pool rooms and so on will arise of themselves because they pay, and the task of the city planner will be not to bring them into existence, but rather to regulate them and to counteract their effects where they are bad.

The complete city will contain provisions for all desirable forms of recreation; and practically all of the outdoor forms, as well as many of the indoor forms, will be provided by the municipality. Since much of the land which must be taken for these purposes is valuable, recreation facilities, like other facilities, must be as efficient as possible per unit of area. This efficiency will be secured by differentiation of function, by proper determination of size and interior arrangement and by proper spacing, throughout the city, of the various pieces of land devoted to recreation. This differentiation is, as we have seen, already well begun and will doubtless be more complete in the future as our knowledge grows.

We find, as we should expect, that when cities have since attacked the problem of outdoor public recreation they have attempted to provide for almost all kinds of needs on the same piece of ground. The large parks have been called upon to serve as resting places, as walking places, as playgrounds, as athletic fields and so on. As the cities have grown around these parks and the use of the parks has become more and more intensive, many of these specialized uses of the parks have been found to be incompatible with one another and with the primary use of the parks. Just how far it is wise to provide separate facilities within the large parks for specialized recreations is still in many cases an unsettled question, and often it is a question which can be settled only in the individual case by a knowledge of the individual circumstances. However, some general considerations can be stated which will hold true in practically every case.

---

*Asst. Professor of Landscape Architecture, Harvard University.

The large park has properly a distinctive and very important purpose: namely, that of affording relief from urban conditions, relief not only by providing an opportunity for a man to do things which he cannot otherwise do in the city, but particularly for him to see and to think things which the city excludes. The freedom of a park, the fact that in a park one may do many different things at his own will and is not forced to do any particular thing, the fact that the park is not obviously designed for one definite and recognized object, is the very essence of the value of a park; but it is also an element of great danger to a park when men come to seek for space for more definite and specialized recreation uses. A playground, for instance, is a thing which anyone can understand; its uses are obvious; its value is evident. To take a small portion of the area of a park for a playground would appear to be the cheapest way in which the city could get land for a playground; it seems to be good for the playground, it seems to be of little harm to the park. But the arguments which justify a community in doing this are just the arguments which are advanced for building schoolhouses in parks, for building libraries and museums in parks, for devoting, in a word, portions of the park to public uses not that of the park; and once granting these arguments, once entering upon this policy, there is no stopping place short of the entire destruction of the park as far as its peculiar recreation function is concerned. The quiet, the informality, the suggestion of natural growth, the lack of buildings in the park are what enable it to serve its purpose, a purpose which has come to be recognized universally as worthy of the expenditure of hundreds of thousands of dollars by almost all of our larger cities. The noisy play of children is absolutely desirable and necessary; the construction of schoolhouses, of museums, of effective public buildings is also a desirable and necessary thing; but the serving of these purposes should not be at the expense of the park. Moreover, the park is an inefficient location for the playground. A playground is a neighborhood utility. It draws only on its immediate surroundings for users; it should be in the midst of a populous district and not where half the land in its vicinity has no permanent inhabitants.

On the other hand, the children's playground does by its very nature belong near the school, as we shall see later more in detail, they both draw upon the same population and therefore normally would be in the same location, the local conditions governing the choice of a site for one apply also to the other, and in use each is helpful to the other.

At present the logic of circumstances has produced, for the most progressive of our cities, the following types of outdoor recreation facilities:

(1) The "reservation," a municipal holding of country land, perhaps in connection with city forests or city water supply, made accessible by roads, it may be, but not yet developed for intensive recreational use, and frequented mostly by picnic parties and others spending several hours at a time in the open.

(2) The large park, or "country park," designed to give, as far as is consistent with fairly intensive use, all the sense of freedom that the unspoiled country gives, and being the nearest thing to unspoiled country that most of the city dwellers can commonly take time to enjoy. It is fitted to receive large crowds and not to be destroyed by them, and indeed not to be crowded by them, for its main use is still to relieve a man from too close contact with his fellows.

(3) The small park, or "intown park," more accessible but less extensive, not pretending to a countrified appearance, but depending upon its design, its foliage and flowers, even upon architectural accessories at times; providing amusements which can be enjoyed by crowds and making the crowd a part of its design. "Commons," "public gardens," many of our larger so-called "squares," are of this type. Our "parkways,"

GENERAL VIEW OF CORSTORPHINE, SCOTLAND.

which serve as pleasure traffic connections for our large parks, have a local use in some cases like small parks.

(4) The playfield, for the active play of adults and young people over twelve, in games taking considerable space, like baseball, football, tennis, track athletics, etc., under supervision.

(5) The boys' outdoor gymnasium, or restricted playfield, for very intensive use by boys over twelve, with apparatus, such as parallel bars, ladders, etc., and a supervisor.

(6) The girls outdoor gymnasium, for intensive use by girls over twelve, with giant strides, swings, etc., and a supervisor.

(7) The children's playground, for boys and girls under twelve, with sand pits, baby hammocks, etc., and a woman teacher in charge.

(8) Special facilities depending upon local opportunities, such as swimming pools, wading pools, skating ponds, facilities for bathing in lake, river or ocean.

As to the best distribution and arrangement of all these facilities, we are still somewhat in the dark. In the light of what experience we have had, however, we believe the following combination of facilities to be efficient. The "park system"—outlying reservations, suburban large parks, radial and circumferential boulevards and parkways—is now an accepted thing. The relation of children's playgrounds to schools is obvious. The neighborhood recreation center—indoor gymnasium, meeting rooms, lockers, showers, etc., outdoor gymnasiums for both sexes of older children, small children's playground and perhaps wading pool, swimming pool and playfield—is now a recognized unit, a workable combination that meets a great need, when land enough can be obtained in one place to allow of combining these activities and profiting by their mutual benefit in upkeep and supervision. And some of us think that the best general arrangement of these recreation facilities throughout the city will prove to be locating these neighborhood centers each where it best serves its district, surrounding each at a suitable distance with resting places and little children's playgrounds, and relating these local provisions to the park and athletic field system by the boulevards and parkways.

If a city were sufficiently provided with these facilities it might properly feel that in the physical provision for outdoor recreation its people were well taken care of; but practically none of our large cities are so provided. The ideal differentiation and combination of recreation facilities is, probably far in the future. For a long time to come we shall be obliged to allow boisterous play in parts of our country parks, construction of schools without sufficient playgrounds, playing of children in the streets made as safe as possible by temporary closing of the streets, but still tolerated as a temporary measure rather than accepted as the final solution of the problem.

COTTAGES IN SCOTLAND.

LANDSCAPE GARDENING AT CORSTORPHINE.

On the broad, general laws governing the size and location of playgrounds and similar public outdoor recreation facilities, we are, I think, all agreed. We believe that every efficient community must set aside a portion of its area for these purposes; that the separate pieces of land which make up this total area devoted to recreation should be of such sizes as best to serve each its chosen function, and so located throughout the community as to be reasonably accessible to those for whose use each is designed. The size of a recreation area will, of course, depend, for one thing, upon its internal organization to fit its use—the size of a tennis court, the size of a baseball field, for instance, is a more or less definite thing, which has to be considered in fixing the boundaries of a playfield. But the great and important factor is the number of people who need the kind of recreation provided by this particular area and who can come to the recreation ground without having to travel too great a distance. In the ideal case, where you are not considering such topographical difficulties as the obstruction of canals, railroads or particularly crowded streets, the area served by a playground will be a circle having for its radius the distance which the people served will travel to get to the playground; and the distance between one playground and another will, of course, be roughly twice this distance. When the playground appeals to a localized class, then the playground seeks the dwelling or working place of this class—a noontime playground would be near a factory, a colored people's playground in the colored district.

PLAYGROUND AT SPOKANE.

Having decided in a general way, by the consideration of these major factors, on the approximate place where the playground is to be located, the exact piece of ground to be chosen will be determined by the suitability of the site to the recreation purpose and by the consideration of cost. Suitability of site depends both on whether the site suits the playground (for instance, you do not of choice put a playground on the steep side of a hill) and on whether the playground suits the site (you do not put a playground next to a hospital).

The cost is the final deciding factor, which, wrongly understood, has wrecked more well-intentioned recreation schemes than anything else that can be named. It is in the consideration of this factor that the experience of the city planner will stand him in good stead. Cost is the measure of the desirability of a particular site for any purpose whatsoever for which men will pay money. It is the proof that other utilities besides that of recreation are bidding for this piece of land, as they are bidding for all the land in the city. The good city planner will naturally choose for his playgrounds, other things being equal, land which is most valuable when used as a playground, not land which would be most valuable if used, for instance, for a factory. But this consideration must not blind him to the larger fact that, unless the district to be served has a playground somewhere in the immediated vicinity, it is not fit to live in, and a very large price for a playground would be justified by this fact.

So far I have merely reviewed a field which is more or less familiar to us all. These general considerations are worth having. They may prevent us from going far wrong in meeting the actual problems, but if we mean to go accurately right we must know more. We must know, in usable figures, the various factors which it is so easy to state in general terms. Just how much total playground area is needed for the average American city of a certain size and character? Of what sizes shall the separate playgrounds be? How far apart can they be? The only way to find this out is to determine what the circumstances actually are in our American cities, to record them for reference when they are satisfactory and to determine what is wrong when they are unsatisfactory. By a study of enough data of this kind we can eliminate the local variations and come to definite general conclusions which will enable the designers of our future playgrounds to move with more certainty and to make use of the experience which we are now so painfully acquiring.

It was the purpose of the investigation which prompted this paper to begin the general collation of these facts. The blank forms which you have before you were sent out to such people as seemed most likely to be informed on this subject in all the larger cities of Canada and the United States. The most salient fact demonstrated by the replies received was that only in a few cases had it been possible with the means at hand to accumulate all the data called for, and only in a few instances had the persons concerned with the playground movement had time and opportunity to familiarize themselves sufficiently with the conditions to make them willing to allow their opinions to be used as the basis of any general judgment. The following statements are, therefore, more the intelligent guesses of a few well-informed men working with little precise data than the unes-

PLAYGROUND AT JERSEY CI.Y.

capable result of the compilation of thousands of figures. However, even as they are, they may serve to show what knowledge we should have with more definiteness, and to suggest a way to go about acquiring this knowledge.

Question 1

What do you consider the maximum distance from each of the recreation areas beyond which people find it too hard to come?

A. Little Children's Playgrounds.—A compilation of the answers to this question shows the distance most commonly given, as well as the rough average of all distances given, as *one-quarter of a mile.*

Plainly, the distance will be inversely proportional to the amount of difficulty and danger which lies between the child's house and the playground. Railroads, canals, etc., will almost completely bar the passage of little children,—that is, parents will not allow children to cross such obstacles alone,—and busy streets, especially if they have electric cars and considerable automobile traffic, will produce much the same effect. This is so common a difficulty that there is strong argument for having the playgrounds for children under six years old within each block. There would then be no streets for the children to cross, and mothers could go about their household duties and still be within call of the playground.

PLAYGROUND AT SAN FRANCISCO.

The playground for children of school age, however, should without a doubt be near the schools when this is possible. If the school buildings are ideally placed, they are accessible to all the children, each school—primary, grammar or high school—drawing all the children of appropriate age from its district, and its district lying contiguous on all sides to the districts of other schools of the same grade. One grammar school will then include in its district the districts of more than one primary school, the children as they grow older walking farther to school; and one high school similarly covers the districts of a number of grammar schools. So if the children's playgrounds properly serve the schools, they properly serve the city. And while the playground gives the school light and air and accommodation for the children at recess, the school gives the playground shelter, toilet facilities, room for indoor games and sometimes a gymnasium and baths.

PLAYGROUND AT SAN JUAN, P.R.

The spacing of the schools, therefore, might well be a guide to the spacing of playgrounds. But often in the actual case this school-spacing is far from ideal, and we must determine the proper spacing of the playgrounds directly by determining how far the children may reasonably be expected to come to them. Only one satisfactory way has been found of determining the "effective radius" of any playground, and that is to record the residence of all children attending a playground and discover what is the radius of the circle that will include the great majority, say 80 per cent., of the children's homes. This will give existing conditions accurately. There will still remain to be determined whether some greater attraction at the ground, some different traffic regulation, some further education of the people, perhaps some free public method of conveying children to playgrounds as they are now sometimes conveyed to schools, would not modify these results; but of course such modifying circumstances will apply to any data that we could obtain.

B. Playfields. In such of the answers to this question as seemed to be the results of original investigation, the average effective radius given was about *one-half a mile.*

As these recreation areas are used mostly by children who are able to go about without the company of older people, their effective radius is naturally longer than that of the little children's playgrounds. The limiting factor here seems to be inertia rather than danger or inconvenience. To most city children or young men a walk of much over half a mile needs a considerable attraction at the end. Commonly a person will seek some other amusement nearer home rather than walk over half a mile to a playfield. And if he is willing to pay five cents and take a street car, he will probably ride, not to the playfield, but rather to a large park, a large athletic field, a bathing beach or some such more interesting place at a still greater distance. So the effective radius of the playfield seems not to be much increased by the use of the street cars. The boys' and girls' outdoor gymnasium or restricted playfield has apparently much the same effective radius as the "playfield."

ENTRANCE TO NEW PALACE, POTSDAM.

C. Neighborhood Centers. The average effective radius given in the replies under this head is about *half a mile.* The neighborhood center is a group of a number of recreation facilities, appealing to different classes of people and drawing them from different distances. The little children's playground serves, as we have seen, an area of one-quarter of a mile radius, whereas the swimming pool will draw boys from a mile or more if there is no competing pool. It is probably best to space the neighborhood centers in relation to the circles of influence of the kinds of recreation carried on in the neighborhood center which have the longest effective radius, and to duplicate the short-radius recreation facilities —e. g., little children's playgrounds—spaced according to their own circles of influence, in a subsidiary ring around each recreation center.

D. School Playgrounds. School playgrounds will be of the different kinds already mentioned. The little children's playground should serve the primary schools; the boys' and girls' playgrounds and smaller playfields should serve the grammar schools; the larger playfields or athletic fields should serve the high schools. Of course this parallel is not absolute, but in general in the United States the school ages and the different types of playgrounds correspond in this way.

E. Grounds for Special Sports; for instance: swimming, skating, curling, lawn bowls, tennis, baseball and football on full-sized grounds.

The fact as to the effective radius of these special recreations is simply that a devotee of a special sport will go any reasonable distance to indulge in it. A five-cent fare in the street cars plus half a mile of walking would certainly not deter many of the enthusiasts.

There follow three interesting personal opinions bearing on the subject of effective radius of playgrounds:

Mr. Joseph Lee, In the *Chautauquan,* June, 1906, p. 354.

Effective radius for playground areas:

(1) For children in arms: one-quarter mile.
(2) For children under six, who can walk: one-quarter mile, not crossing electric or railroad track.
(3) Children 6-12: half mile.
(4) Children 12-17 who cannot afford car fare: three-quarter mile.
(5) Ball fields for men and boys: 1 mile plus five-cent car fare.

These are maximum radii.

Report of Parks and Playgrounds Association, Inc., of City of New York, 1909, p. 4.

The experience here of block limitation is typical of many localities for playground work. A complete and accurate registration with addresses was kept of all members, and maps prepared with a dot for each child placed at its house. These maps, included in the appendix, show that children under twelve or thirteen, as a rule, do not go more than two blocks for a playground, that they are loath to cross avenues; and to form an adequate system of playgrounds, a small lot placed at distances not greater than five blocks, between avenues, is the only effective plan. For older boys and girls, for athletic events, baseball or occasional trips, much longer distances may be given.

George A. Bellamy, Board of Trustees, The Hiram House, Cleveland, Ohio.

There are four kinds of playgrounds:

(1) For small children located so as to draw children from two ordinary city blocks any direction.

(2) Playgrounds for children who can go three or four blocks. Both of these playgrounds are usually open in the summer only and during good weather.

(3) Large playground of ten acres or more

with a field house, such as the municipal centers in Chicago, drawing upon a population of half a mile radius or more.

(4) Large area varying from ten to a hundred or five hundred acres, which supply the need for the entire city's population for large municipal recreational activities.

Question 2

Do racial or social barriers affect the use of the playgrounds?

The concensus of opinion is this:

The playground is the best place to overcome racial and social prejudices—feats of strength and agility are recognized as worth while by all children, and there grows up in the playground, under proper supervision, a democracy of play, or at any rate an aristocracy of physical excellence but little influenced by race.

A playground in a racially or socially definite and homogeneous neighborhood takes its social standards from its users. Race segregation in this way is more or less automatic in many playgrounds, as, of course, is segregation according to wealth. In the case of *negroes,* the combined playground seems to be impossible in the South and elsewhere where this race prejudice is strong.

There follow two interesting and diverse opinions:

S. Dillon Mills, Toronto Playground Association.

Influence of Racial and Social Differences.—All races are to be found in our schools and in the limited playgrounds attached to most of them; it is not advisable to encourage racial separation; we cannot build up a united nation in any place so well as in the playground. As to *social barriers,* the true democratic spirit does not recognize them; economic conditions will in any case cause a rough separation of wealth from poverty; the poor cannot live in the same quarters as the rich; if they knew more of each other it would be better for both; in Toronto this separation is so complete that the question does not arise as regards playgrounds.

Lafon Allen, former President Louisville Recreation League.

. . . We found it was out of the question to arrange successfully for the simultaneous use of the playground by children of both races (white and black). My recollection is that we finally settled upon a scheme of certain hours for white children and other hours for colored children. This was quite unsatisfactory, but it seemed the best thing that could be done. Even at that, a good many white parents would not permit their children to come to this playground because it was used by colored children.

Questions 3 *and* 4.

3. (*a*) How much land *in toto* for the whole city do you consider requisite per capita to total population for the various recreation uses?

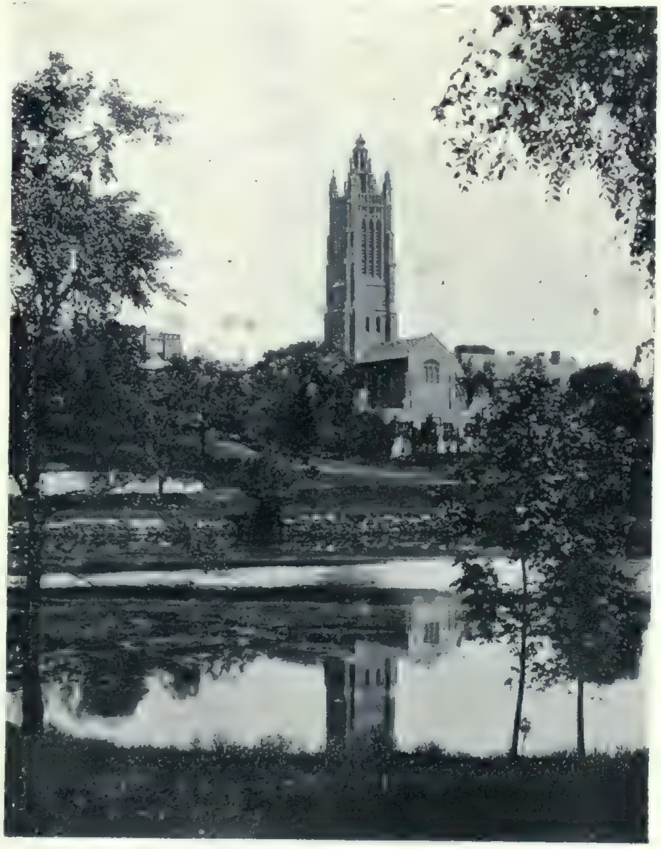
Little children's playgrounds.
Playfields.
Neighborhood centres.
School playgrounds.
Grounds for special sports.

(*b*) How much land *in toto* for the whole city do you consider requisite per capita for actual attendance?

4. What total area of separate playground do you consider necessary for the effective performance of its functions for each type, with due regard to first cost and operating expense?

Very few replies were received to fit the form in which these questions were asked. From the various fragmentary replies and the opinions returned, moreover, it is evident that, except for the playgrounds for smaller children, little definite collection of figures has been made, and most of the opinions are general impressions only.

The consensus of opinion as to children's playgrounds is that 30 square feet per child is a minimum space, and 75 square feet is none too much. This appears to be based on an assumption that about half of the children will be actually playing at one time, for such figures as are obtained as to maximum crowding allowable give about 300 children per acre as the "point of saturation," and this is over 140 square feet per child.



PERKINS INSTITUTION, WATERTOWN.

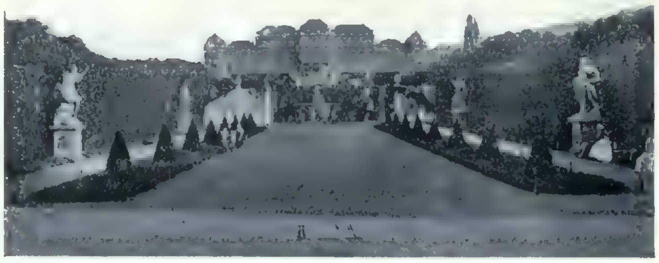
Several opinions follow:

Francis R. North, Playground and Recreation Association of America.

Fifty to 75 square feet per child is a reasonable minimum on school playfields. Three hundred children an acre when children are playing at once.

C. Ward Crampton, Director of Physical Training, Department of Education, New York City.

The minimum allowance of space per school child should be 30 square feet. The space will also take care of the adolescent situation, if one-third of it is enclosed and all of it provided with artificial lights. Sixty per cent. of this space should be attached to schools which should be used as their neighborhood centres; the balance obtained by the use of parks. This is the absolute minimum. In addition, in all centres of population of 10,000 and over, there should be a space of 400 × 600 feet for use as an athletic field, and for occasional civic demonstrations and pageants. With each 50,000 population, this should be duplicated. In addition to the provision of this space, there should be provided seats for at least 1,000, and facilities of the type used by the Department of Education, New York City, for its athletic fields.



ROYAL PALACE, BELVEDERE, VIENNA.

British Institute of Social Service.

III. That where provision is made for games:

(a) Each undivided playground for 200 children and upwards should provide:

(1) 20 square feet for each older child.
(2) 16 square feet for each infant.

(b) Each undivided playground for less than 200 children should provide 2,000 square feet, together with:

(1) 10 square feet for each older child.
(2) 6 square feet for each infant.

IV. That where no other provision is made for games:

(a) Each undivided playground for 200 children and upwards should provide:

(1) 30 square feet for each older child.
(2) 16 square feet for each infant.

(b) Each undivided playground for less than 200 children should provide 2,000 square feet, together with:

(1) 20 square feet for each older child.
(2) 6 square feet for each infant.

V. That

(a) Where a site is expensive (regard being had to the price of the land and the resources of the authority), the Board may accept a playground below the measurements specified in Section IV (a) and (b) above.

(b) The precise degree of reduction from this standard shall be decided on the merits of each case, but in no case shall the reduction bring the playground below the measurements specified in Section III (a) and (b).

S. Dillon Mills, Toronto Playgrounds Association.

Extent of Ground.—About one *square* acre for 150 children is the minimum for effective play. But calculations of this kind are very unreliable; the temperament, nationality and previous habits of the children form factors of unknown quantities and of great importance in the matter: 300 children of the slum type or of phlegmatic temperament could play quite acceptably in a space in which 100 active youngsters would be hopelessly crowded. The child population of every district varies from year to year; actual playground attendance even more so: it is at best a very uncertain quantity, one respecting which no means has yet been devised for obtaining figures with accuracy. Two acres appears to be the smallest admissible in an average district of one-quarter of a mile radius with house rents averaging $25 per month, and the reason that this space is sufficient in any instance arises from the fact that not more than about one fifth of the school population will be found in the ground at any one time, unless there is some special attraction, such as annual games, etc. Three acres would be much better, for it must be remembered that children are not always engaged in active play; they desire also rest, and cannot have this unless they have room to retire from the boisterous crowd. This is one reason why in Toronto we find so many children in the streets near the open playground. Space should also be available for garden plots and for shade trees. The size of recreation grounds for older persons does not come within the scope of these notes.

An Opinion from Minneapolis.

There should be one acre of little children's playground for each 15,000 population; one acre devoted to the uses of a neighborhood center for every 5,000; and one acre for grounds for special sports (baseball, football and athletics) for each ten thousand of population.

A little children's playground should be at least least 1 acre in area, a playfield from 2 to 10 acres, a neighborhood center from 2 to 4 acres, a ground for special sports from 2 to 10 acres.

Question 5

To what extent do you believe it expedient and wise to use and to depend upon using for play purposes land primarily devoted to other purposes, such as unoccupied land, designated streets, etc.?

GARDEN AT FONTAINEBLEAU.

The opinions on this topic were generally in accord, and can be summarized thus:

Unoccupied ground may well be used for children's play if no better facilities can be obtained. Successful intensive play needs apparatus and superintendence, however, and neither can readily be provided for an uncertain and temporary opportunity. The question really centers about the use of streets for play. If a city is well planned, so that heavy and fast traffic keep to their own main thoroughfares, leaving the residential side streets comparatively free; and if these side streets have the minimum of road surface and the maximum of turf or sidewalk according to the density of population; and if perhaps, in addition, the streets are barred to traffic during certain hours, then play in the streets may be more or less successful. But there is no denying the general fact that play in areas specially designed for play is better.

Several opinions follow:

S. Dillon Mills, Toronto Playground Association.

Use of Streets as Playgrounds.—Where nothing better can be done this is excusable, but there are many objections. The city becomes liable to claim for damages to house property, etc. The street being a long, narrow strip, renders supervision very difficult; the absence of supervision means simply leaving things as they are: we are looking for progress. The stopping of traffic on any one street during play hours, and the assembling of the children from several adjacent streets on it, are serious annoyances to the residents, even with supervision, and will be likely to cause depreciation in property values on that street, unless in actual slum areas, where annoyance caused to tenants cuts a very small figure because they cannot help themselves. There is just one bright feature about street playground and that is—that if the supervisors are of the right type, their street work will open to them many opportunities for doing splendid social service.

George A. Bellamy, Board of Trustees, The Hiram House, Cleveland, Ohio.

Where land is expensive, I think it is quite possible with good results to depend upon the use of the streets where traffic is limited at certain hours of the day for play purposes. Policemen on their beat could very well manage the opening up of certain streets for certain games, eliminating danger to life. The city could well afford to pay an instructor for certain hours to control games on the street set aside for such purposes. Of course the street does not make as desirable a place to play as the ordinary ground, but it is better that it be regulated and be made lawful for the children to use the streets at certain hours than to have promiscuous play undirected and contrary to law, as it is in some cities.

Francis R. North, Playground and Recreation Association of America.

I do not think that the streets ought to be depended upon, except as a temporary measure. They can be closed in certain periods of the day and used for play. The increased use of automobiles is rapidly making ordinary use of streets less and less practicable.

To return now to the questions with which we started our investigation:

Just how much total playground area is needed for the average American city of a certain size and character? Of what sizes shall the separate playgrounds be? How far apart shall they be?

PARK AT DRESDEN.

Our conclusion is apparently this: we have not yet collected data enough to enable us to answer these questions, but we do know what data we need and how to get it.

Let us turn to the people in charge of the various recreation facilities, the teachers in the little children's playground, the instructors in the boys' and girls' outdoor gymnasia, those in charge of the swimming pools, the playfields, the larger athletic fields. Let each one of these people record accurately, for his own playground (and for each activity in his playground, if these activities are assigned separate spaces) the following five points:

(1) How large is the area of useful playing surface?

(2) Just what activities are carried on upon it?

(3) How many people does it take, using the ground at one time, to fill the playground to its maximum efficient capacity?

(4) What is the age, sex, race and occupation of each person enjoying each recreation?

(5) From what distance does each person come to the playground?

These data can all be obtained and recorded by those locally interested, without any special trained knowledge of statistics.

Further, we should have from each city, for every residential area tributary to a playground, the total population and its character, and the total juvenile population. These facts could be obtained in part from the city census, in part from the school census, and completed with sufficient accuracy by sample counts or ''soundings'' in each area treated.

By a comparison of the number of people actually attending a certain playground with the number of people within its tributary area for whom the playground is designed, the proportion of predictable attendance to possible attendance can be obtained; and the collation of these figures from many playgrounds would give us a generally applicable ratio.

If a definite form in which all these data could be recorded was used in every case, the information relating to the same kind of recreation activity throughout the country could then be compiled by some central authority. We should then know (as far as it is possible to know) the three main considerations which determine the size and spacing of playgrounds and other similar recreation facilities: (1) what, under present conditions, is the minimum efficient area of ground, per person present, for each of our recreation facilities; (2) from what size of surrounding residential area people will come to each recreation facility; and (3) how many people will actually come to each kind of recreation area from a surrounding residential area of a certain character and number of inhabitants.

To apply this knowledge in designing a new city recreation system, or improving an old one, we should first determine the various characters and densities of population throughout the city, and tentatively locate on the map the various recreation facilities that are to serve the population, having regard to the effective radius of each facility. We should then determine how many people, of an age and sex to use each particular playground under discussion, live within its effective radius from its proposed site. Now, by applying our ratio of actual users to possible users, we should obtain the total number of persons to be reasonably expected as actual users of each playground; and then, by employing our figures as to the necessary number of square feet of space per person attending, we should have as definite an idea as it is possible to get of the proper size of each playground.

A careful restudy in the light of what we should then know of the size and effective radius of each playground would give us a more or less ideal arrangement of recreation facilities for our city.

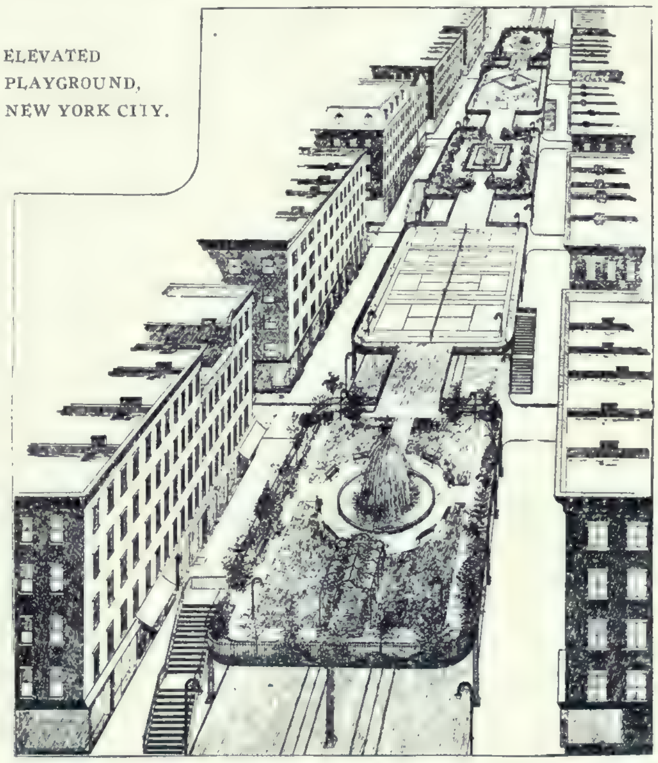
And then would come the practical work without which the ideal scheme is worthless: determining what can be done with the resources in hand, with the various and overlapping departments of the municipal government, with the thousand conflicting private interests, to bring the scheme to a workable realization, to make the city provide for its people what the city has taken away from them—one of the essentials of complete living.

Readjustment for Greater Efficiency.—The basic principle of city planning is to increase the working efficiency of the city. No far-seeing business man would undertake the construction of a large manufacturing plant without making provision for future expansion and other possible contingencies, but the building of a city, our most important and complicated enterprise often proceeds in a haphazard fashion without preparation for change or growth. The result is the confusion and congestion with which we are all so familiar. — *Arnold W. Brunner.*

Cities that Grow.—Cities exist because human beings can work more effectively and play more enjoyably in groups than alone. Cities may grow, though poorly planned, if possessing superior natural advantages. Cities may grow if wisely planned, despite unfavorable location or topography. Cities MUST grow which combine superior natural advantages with far-sighted planning for present and future needs. And, if community expenditures are assessed in proportion to benefits conferred, the people who work and play in such cities will enjoy a steadily increasing happiness.—*Harold S. Buttenheim.*

Elevated Playgrounds

According to the New York *Times* the last word in up-to-date playgrounds was uttered when New York formally opened its first elevated playground to the mothers and children of the east side. To plan the city's recreation, especially in the heavily congested districts, has for the past decade been one of New York's gravest problems. By way of solution there have been playgrounds on piers, playgrounds on roofs, even suggestions for floating playgrounds on the water. But one of the most novel suggestions for play space was put forth a few months ago by Hugh E. McLaughlin, a civil engineer. It was a suggestion to utilize the space above streets in the congested districts, not already occupied by elevated roads, for elevated playgrounds. The idea, although new and therefore likely to be branded as impracticable, met with immediate favor from the city administration, and the first elevated playground, at the Manhattan end of the Williamsburg bridge, was thrown open July eighth. Thirty thousand square feet at the end of the Williamsburg Bridge has been going to waste since the bridge was built. This space was an open cut which broke the esplanade at Clinton and Delancey Streets under which the elevated trains ran. On either side were the north and south footwalks of the bridge. A flooring has been placed over this open cut, giving a playground and park area measuring 68 by 450 feet. In the center a bandstand has been constructed, and through the Summer evenings there are to be not only band concerts but dances.



ELEVATED PLAYGROUND, NEW YORK CITY.

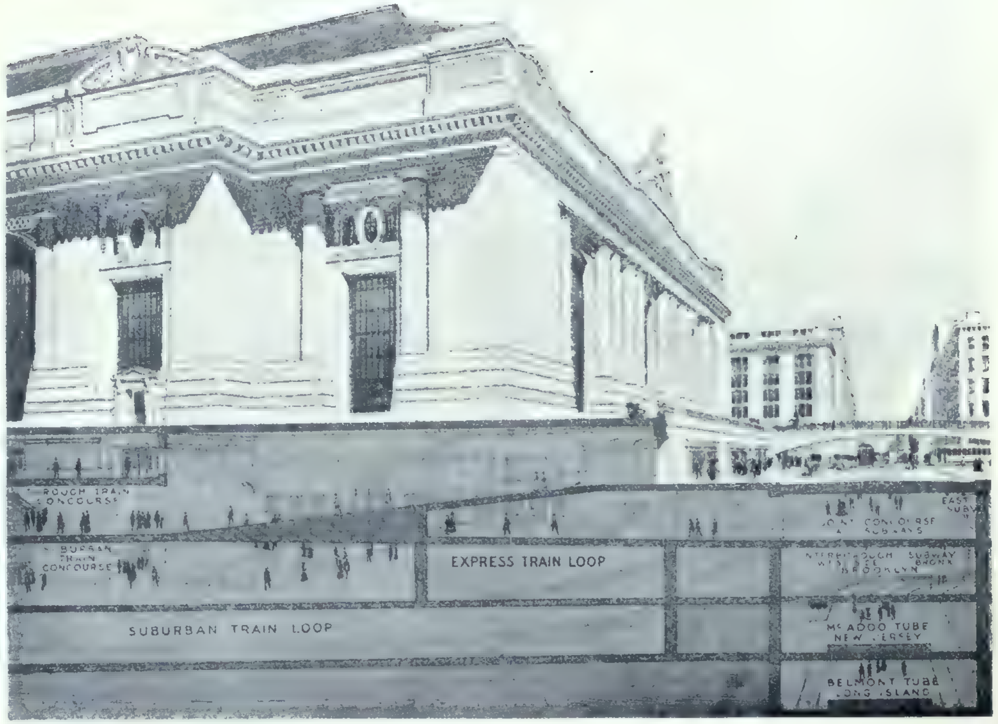
"The Williamsburg Bridge playground is only the start," explained Mr. McLaughlin. "My idea would be ultimately to build a series of these elevated playgrounds along New York's entire east side. That is, along First Avenue north of Twenty-third Street as far up as the density of the population requires it. At Twenty-third Street the elevated road begins. Switch the elevated playgrounds, therefore, along Second Avenue from Twenty-third Street south.

"These playgrounds are not to be mere bare spaces where people can climb up to sit. They are to be real playgrounds, and beautiful parks. My plan is to build them in alternating sections 60 by 200 feet, the first section a park with grass, shrubs, vine shelters, and even trees, where the older folk especially will like to come to sit on hot afternoons and warm Summer nights. "These park squares can be made things of genuine beauty for the crowded dwellers on the third and fourth floors of the tenements on either side to look out upon. To say that an upper deck park of this sort would be impossible or too expensive is absurd. Two feet of earth will grow grass and a great variety of shrubs. Three or four feet of earth will grow some of the firs, especially the hemlocks, whose roots run out along the surface of the ground. Vine-covered trellises, fountains and flower beds are possible.

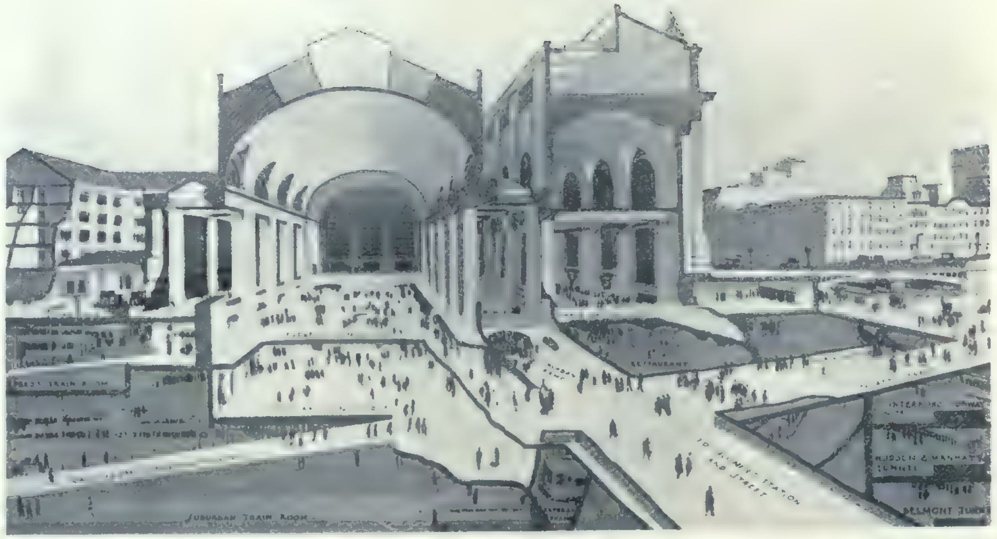
"The alternating sections will be the playgrounds proper. Here unlimited possibilities unfold. The great difficulty for those who have planned roof playgrounds or even pier playgrounds has been lack of space for real sports. The long, narrow shape of these playground sections adapts itself easily for games. "Think what it would mean to take baseball off the street! That alone would justify putting up a mile or so of elevated playgrounds. "It is absurd to call the innocent play of our children criminal and to arrest them for it when we give them no places for recreation. Many of our boys take their first step in delinquency for nothing more than playing ball.

"Now, on these elevated playgrounds there would be covered baseball diamonds and plenty of them. In addition there would be running tracks, a football field, tennis courts, basketball courts, and sections reserved for the smaller children with swings and simple gymnasium apparatus.

One thing we have forgotten in planning for our playgrounds in this city—the outlook of the child. The child's realm is a very small one, bounded at either end by the streets that cross the avenue where he lives.



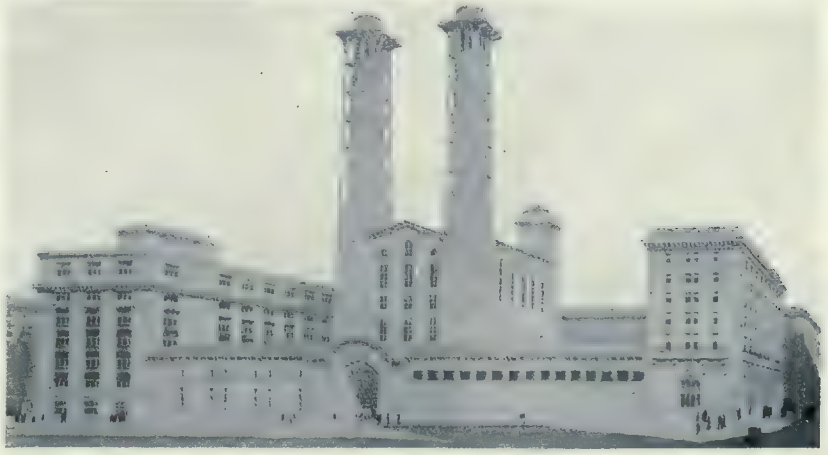
SECTIONAL VIEW OF SUBWAY CONNECTIONS.



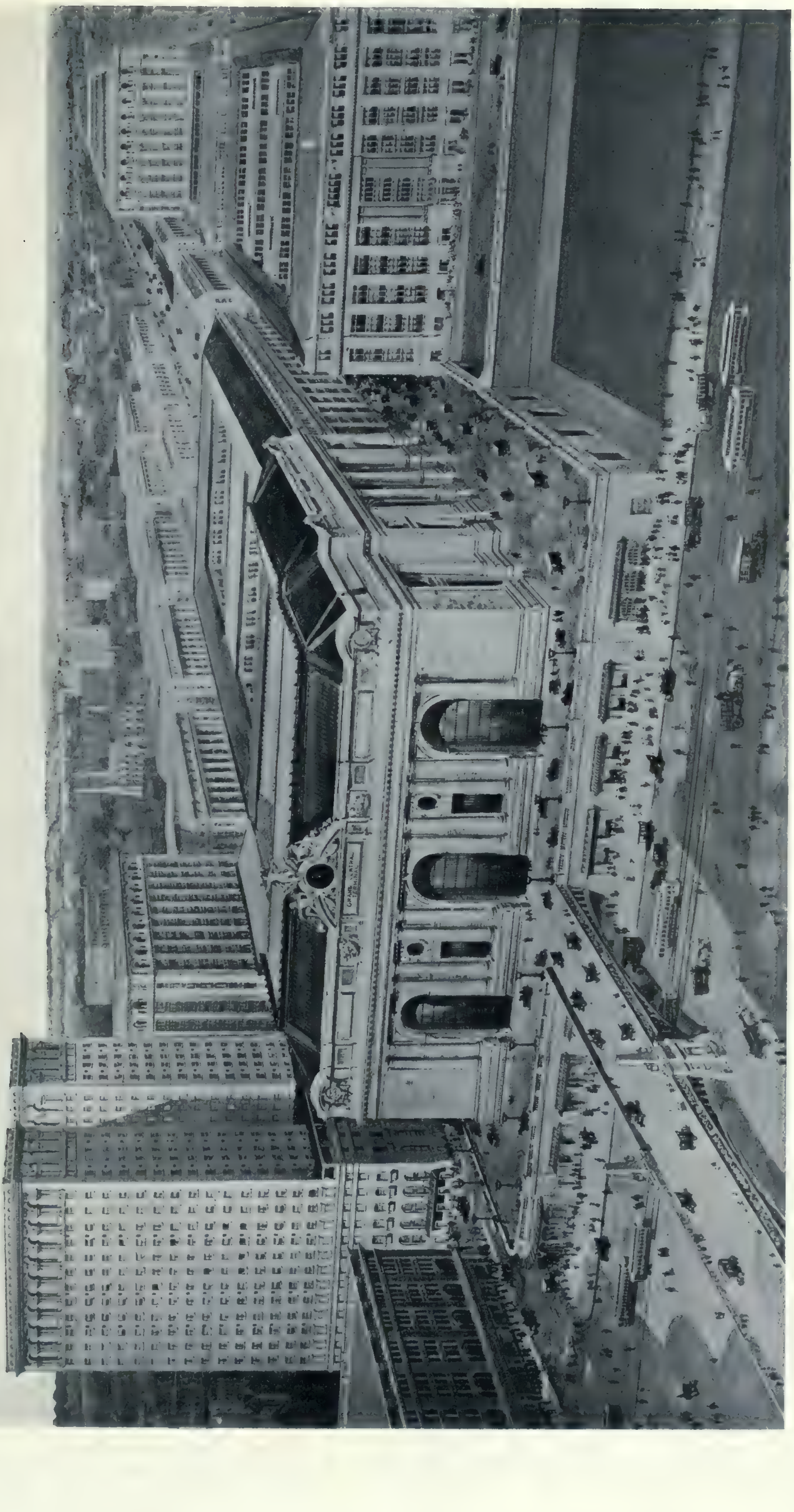
CROSS SECTION SHOWING INCLINE WALKS.

GRAND
CENTRAL
RAILWAY
TERMINAL,
NEW YORK CITY.

RESTAURANT WITH GROTTO-LIKE EFFECT.



HEATING AND LIGHTING PLANT.



GRAND CENTRAL TERMINAL, NEW YORK CITY.

CONSTRUCTION

A · JOURNAL · FOR · THE · ARCHITECTURAL
ENGINEERING · AND · CONTRACTING
INTERESTS · OF · CANADA

Αρχιτεκτονία

FREDERICK REED, Editor
H. GAGNIER, LIMITED, PUBLISHERS
Corner Richmond and Sheppard Streets,
Toronto - - Canada

BRANCH OFFICES:
MONTREAL—171 St. James Street
WINNIPEG, MAN.—13 Royal Bank Building
CHICAGO—People's Gas Building
NEW YORK—156 5th Avenue

CORRESPONDENCE.—All correspondence should be addressed to "CONSTRUCTION," Corner Richmond and Sheppard Streets, Toronto, Canada.

SUBSCRIPTIONS—Canada and Great Britain, $3.00 per annum. United States, the Continent and all Postal Union countries, $4.00 per anum, in advance. Single copies, 35c.

ADVERTISEMENTS—Changes of, or new advertisements must reach the Head Office not later than the twentieth of the month preceding publication, to ensure insertion. Mailing date is on the tenth of each month. Advertising rates on application.

CONTRIBUTIONS—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and duly returned.

Entered as Second Class Matter in the Post Office at Toronto, Canada.

Vol. VII Toronto, August, 1914 No. 8

CURRENT TOPICS

D. C. COTTON, architect, has removed his offices from 36 Toronto street to 54 Adelaide street east, Toronto.

* * *

ATTENTION—ARCHITECTS.

The Shakespeare Memorial Committee is instituting a competition for designs for the erection of the Theatre, and as a preliminary step it invites architects to submit photographs or drawings of important buildings they have erected or designed, with a view to the selection of six architects, who will be invited to enter the competition.

The Committee reserves the right to add two names to the number of architects so selected, and has appointed Mr. T. E. Collcutt, Past President R.I.B.A., to act as assessor for the competition, to draw up the conditions and instructions, and to select six designs.

The authors of five such selected designs shall each receive a premium of 150 guineas, and the author of the design placed first by the assessor shall receive a premium of 500 guineas, to be merged in the remuneration payable to him on the preparation of the contract drawings. Such remuneration shall be as provided in the schedule of charges for professional practice as sanctioned by the Royal Institute of British Architects.

Preliminary conditions of the competition may be obtained on application to the Secretary, the Shakespeare Memorial Committee, 3a Dean's Yard, Westminster Abbey, London, S.W., to whom drawings and photographs must be sent on or before the 15th day of September, 1914.

* * *

BULLETIN B 7, issued recently by the Herbert Morris Crane & Hoist Company, Limited, is devoted exclusively to a hand operated overhead travelling crane, light in construction and designed in various sizes up to 1½ ton. By making all the main parts of rolled-steel section the weight of the crane itself has been kept very low, thus avoiding that disproportion between the dead weight and the live or useful weight which is so often a discouraging feature of all overhead travelling cranes.

* * *

THE Royal Architectural Institute of Canada will hold their seventh general annual assembly at Quebec, September 21-22, 1914. At the inaugural session addresses by His Worship the Mayor of Quebec, the President of the Quebec Section of the Province of Quebec Association of Architects, and the President of the Quebec Builders' Exchange will be responded to by J. H. G. Russell, President of the R. A. I C. On the afternoon of the second day V. J. Elmont will read a paper on "The application of Reinforced Concrete to Dome Structure." Arrangements have been made for complimentary luncheons by J. P. Ouellet, and the architects of Quebec City; also an automobile trip to the various points of interest in this old historic town. Further information may be secured from Alcide Chausse, Hon. Secretary, 5 Beaver Hall Square, Montreal.

* * *

"CERTAINTY"

is what is sought for by everyone. With the Architect and Engineer this is particularly true

The Dietzgen Instruments and Materials are manufactured in our own Factories under the discipline of establishing Accuracy and Dependability; always with the idea of the exacting purpose for which they are intended, and not simply as merchandise to sell—to co-operate and verify with exactness the thought behind their use.

EUGENE DIETZGEN CO., LTD.,
116 Adelaide St. W., Toronto.

CONSTRUCTION

September, 1914 Vol. 7, No. 9

CONTENTS

EDITORIAL 337
War and its destructive effects on art.——Canada's outlook and duty during the war.
PROTECTING RESIDENTIAL DISTRICTS 339
HALIFAX OCEAN TERMINALS 349
RAPID TRANSIT 353
CURRENT TOPICS 362

Full Page Illustrations

LONDON, VIEW FROM BUCKINGHAM PALACE .... Frontispiece
INTERNATIONAL WORLD CENTRE 338

H. GAGNIER, Limited, Publishers
GRAPHIC ARTS BLDG., TORONTO, CANADA
BRANCH OFFICES
MONTREAL NEW YORK

LONDON,
VIEW FROM
BUCKINGHAM
PALACE.

EDITORIAL

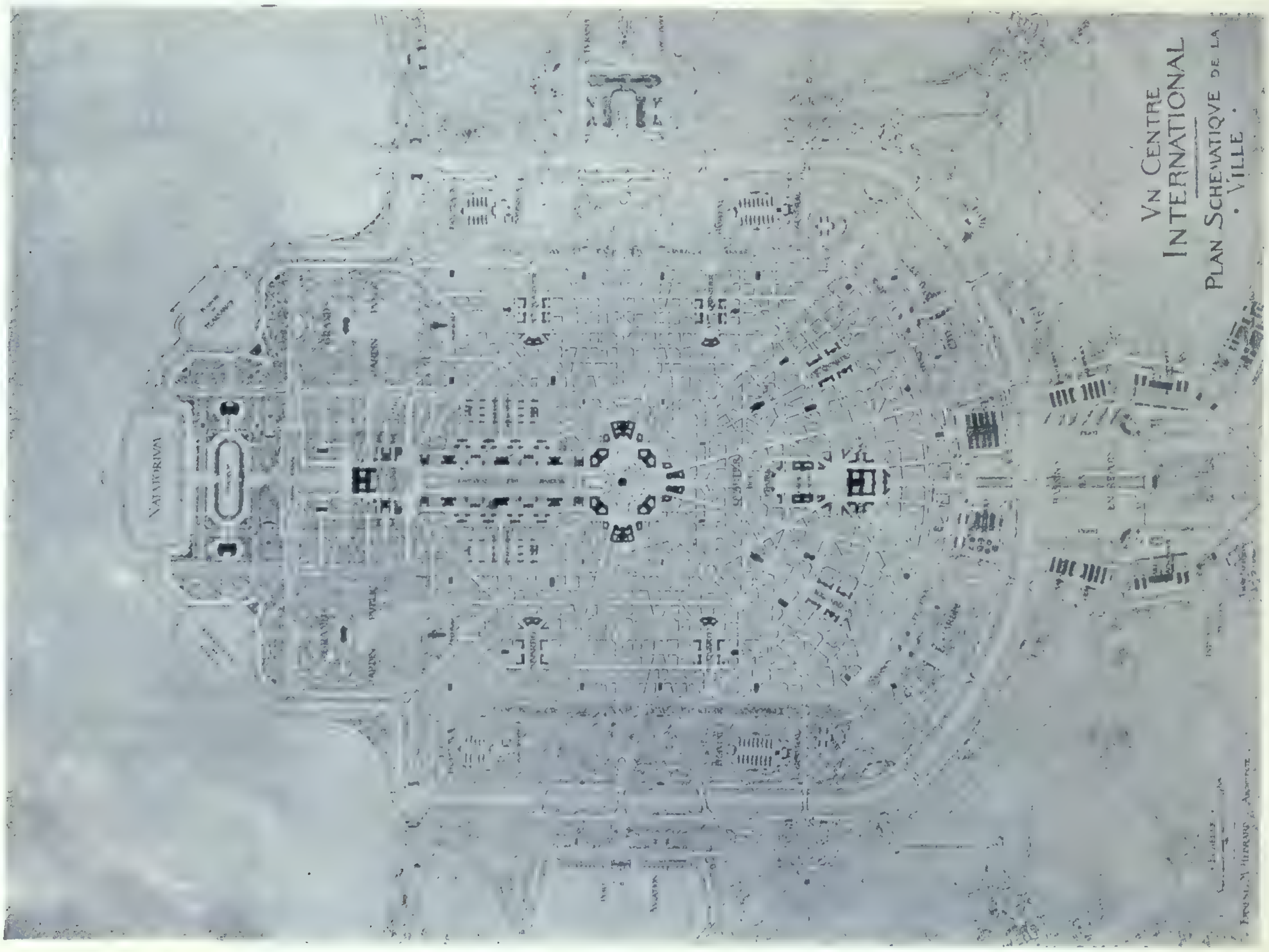
War and its dire results as well as its complement of peace—Loss to all phases of art and the physical condition of the various peoples.

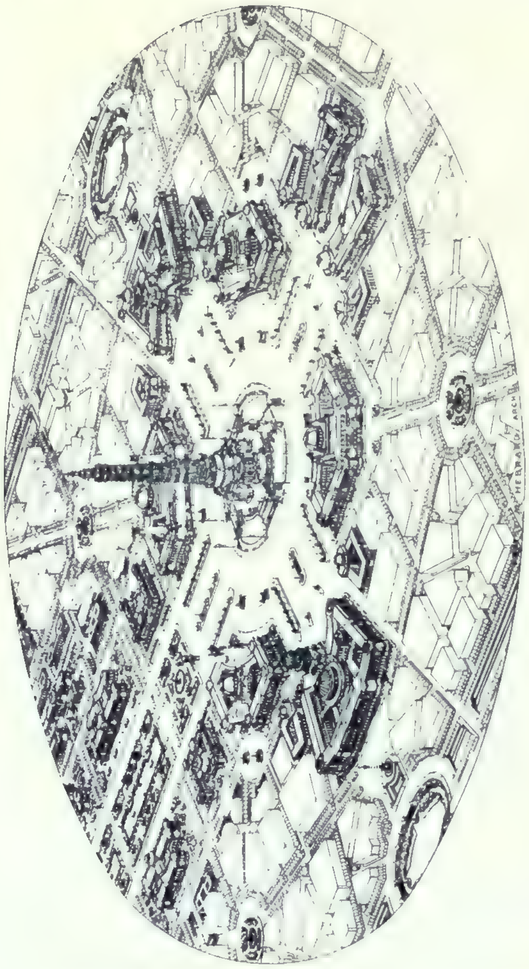
WAR is rampant and judging from present conditions the sane man of yesterday has proven the unknown quantity of to-day. Europe thinks of revenge or self protection and turns its back to the terrible suffering attached thereto. The high moral attitude of the most civilized nations in the world has proven little less than a mask which conceals the studied plans of ambition, power and conquest. Kill and destroy will be the slogan, but at what an irreparable loss to all mankind. Much of the art which sprung from an age of truth will doubtless become a thing of memory. Ruthless devastation will rob us of our best examples of painting, sculpture, and architecture. As former ages cried out in vain against similar crimes so we must abide by the results, no matter if we are destroying the monuments of our sires; demolishing the very life of our present culture, and robbing the future of the great and ennobling works of God, produced by the hand of mankind. To attempt an expression of the dire results to follow is beyond our most acute imagination. As in art so in the morale of the people. Trade may reach its normal after years and years of struggle but the moral and physical level may be lowered to such an extent that the remnant will never be able to bring it back to the present standard. But why dwell on the pessimistic phase, for there is a bright side even though it comes with widespread sorrow. If the warring nations struggle until they are completely exhausted then we will undoubtedly see the dawn of peace. No more will the people spend their millions for dreadnaughts and armored air cruisers but rather will the revenue go to the betterment of those to whom it rightfully belongs. No more will cruel grief eat out the very heart of civilization but the homes will burn with the fire of love and contentment. Money will cease to be our god and once more we will work to the uplifting of all human kind and the present forced condition of slavery among all men will be eradicated and our very best will come forth on account of a freedom which springs from the desire to work for art's sake.

Canada's outlook after the present war—The calm attitude assumed by large business organizations—Our duty to create sane conditions at this crisis.

THE frenzied excitement caused to the various industries and business concerns by the present war is gradually changing to a calm and serious meditation as to what it will mean to Canada's progress. The first thought was to become most pessimistic and bring the country on the verge of a panic, which state of affairs was quickly remedied by prompt action of the government and the various large financial centres. As a result we have gained time to analyze the causes and figure out as much as possible the future results. Appreciating the fact that no country will benefit more than England and her Colonies, many houses which were panic stricken at first are once more working under normal conditions, while others are confident that all business will receive an added stimulus. The report of the *Architects' and Builders' Journal,* London, is worthy of quoting in this connection, and ought to be most reassuring: ''Most of the replies we have received from architects, builders, builders' merchants, and others, as to the war's immediate effects on trade are decidedly optimistic. 'Business as usual' is their general tenor. For example, Waygood-Otis, Ltd., say: 'We consider it the duty of all business houses to proceed, as far as possible, as though war did not exist. This we are doing.' Other firms give such encouraging reports as: 'We have not made any alteration in our establishment on account of the present war crisis, all our jobs are proceeding normally.''

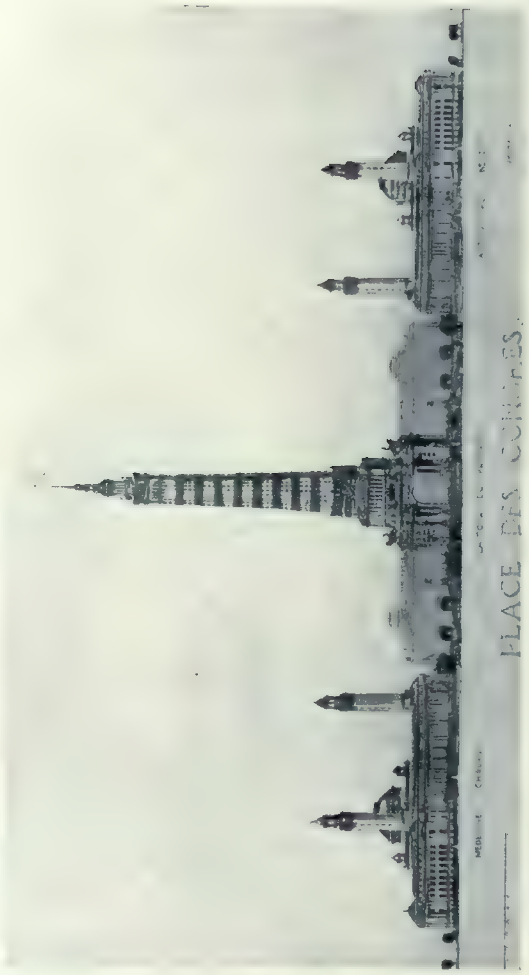
At such a critical period we must unite in a consistent endeavor to push ahead. Let us grasp the spirit of one of Canada's largest industries which will use their surplus fund in making and storing, if necessary, the product which they manufacture. Canada and the States are self supporting which is in itself a safe basis upon which to work. In addition to this we have the markets of the world opened as never before, and with slight modifications the trade of nations inimical to our best interests can become an added asset. We can fight for the upholding of our noble traditions as well by carrying on our business relations similar to those in times of peace, as well as by bearing arms.





THE TOWER OF PROGRESS.

AN INTERNATIONAL WORLD CENTRE CONCEIVED BY H. C. ANDERSON AND EXECUTED BY M. JEAN HEBRARD.



Protecting Residential Districts

LAWRENCE VEILLER*

DOES the constitutional right to life, liberty and the pursuit of happiness include those important considerations which our English cousins in their recent town-planning legislation refer to as the "amenities"?

This is a question which many people are beginning to ask themselves in America.

It is only in very recent years that we have been conscious of the necessity of doing something to protect our citizens in the enjoyment of the right to lead a quiet, contented, rational existence and bring up their families free from the noise, discomfort and nerve-racking atmosphere which generally surrounds our industries.

Heretofore we have gone along in a truly American fashion of mixing up in a haphazard way business and residential districts without regard to the rights of others or the welfare of the community.

But during the last few years in a few of our larger cities we have awakened to the folly of this disorderly and thoughtless method of living and are beginning to ask ourselves whether these discomforts of living are really necessary after all.

I must frankly confess that we have cast somewhat longing eyes at the shores of Germany and wondered whether there was something so essentially different in the atmosphere of Germany and America that it would be impossible for us to engraft upon American civilization the well-established principle of zoning that has been in operation for a generation or more in that country.

"A man's a man for a' that," and it has seemed to some of us that there was not such an essential difference between the human characteristics of the German and the American as to make it a frantic imagining or Utopian dream for even us in America to expect that the time might come when we might insure to our citizens the right to live in a peaceful and untrammeled atmosphere. When one comes to consider it, after all it is not the most rational method to employ, the method that we have heretofore followed and considered as the only method, namely, of mixing up in a heterogeneous mass the places where our people live with all sorts of objectionable industries.

I think if we frankly search the records we shall find that this is not really, after all, a new impulse, but only a wider realization of a very desirable consummation to be sought after.

From the earliest days even in America those of us who have not been especially enamored of noise and of a hurly-burly life, have sought so far as mere man could, acting alone and without the powerful support of government, to control his own neighborhood and protect the little home into which he had put his earnings (or the large, luxurious mansion into which he had put somebody else's earnings, as the case may have been) and where he expected to bring up a family and live for the rest of his life.

And so we find for many years in America an effort through private covenant, or what is popularly known as property restrictions, to secure the result desired.

Unfortunately this method, which has been followed to a greater or less degree throughout all parts of the country, has not proved entirely satisfactory; being a private arrangement between private individuals and being only a mutual agreement or contract, it has proved to be easily dissolvable. Furthermore, in many of our states the courts have held that property restrictions imposed some years back by the then owners of property are no longer binding and of effect when the neighborhood conditions have changed and when the succeeding property owners have desired to dissolve the terms of such agreement.

So it is not strange, with the increasing difficulties of city life, that men have turned to other methods and endeavored to see whether they could not find a means by which the right of a man to the enjoyment of his property in peace and quiet might be saved to him and his family and not be easily invaded.

Private covenant having proved ineffective, the use of the police power of the state has finally been sought.

How far the police power will stretch in America is still a question to be decided. One thing is certain, it will not extend beyond what the engineers call "the limits of elasticity."

But just how far *will* it stretch? What can we do in America, with our constitutional limitations, to conserve to property owners and to dwellers in our cities the right to live in a peaceful, quiet, secluded neighborhood free from the invasions of business and of industry and with the amenities of civilization?

That the police power cannot be stretched to cover merely æsthetic considerations is clear from the decisions of our courts.

How far, then, may it extend?

Our most eminent jurists agree in the opinion that it may extend to almost infinite reach so long as it clearly includes matters which affect public health, safety, morals or the general welfare, provided always, of course, that the exercise of such power be a reasonable one.

---

*Secretary National Housing Association.

PERSPECTIVE VIEW OF LINCOLN MEMORIAL, WASHINGTON.

As yet no one has sought to define the meaning of that important term "general welfare." It is a most important one for those interested in progress. I take it to be the American equivalent of our English city planners' "amenity."

What Has Been Done in the United States.

Such efforts as have been made in the United States to extend the use of the police power in this direction have all been within the past few years, the earliest attempt having been in the state of California five years ago. Here in 1909 the first effort to establish residential districts and to exclude therefrom certain industries was made in the city of Los Angeles.

In the year following a similar attempt was made in Michigan, in the city of Grand Rapids, and more recently, viz., in 1913, there seems to have been an epidemic of regulation of this kind, the States of New York, Wisconsin, Minnesota and Illinois having all passed legislation of this nature.

So far as I can ascertain, all these various attempts were made in an unrelated way by each State, without knowledge of what the other was doing; in fact, in most cases I believe without knowledge of what California had done four years previous. And we all furnished that delicious illustration of fancying ourselves pioneers blazing new trails and then discovering afterwards that we were only following in the footsteps of earlier adventurers.

STREET IN ROCHESTER.

The limitations of this meeting permit me only to *outline* some of the distinctive features of these different schemes.

California Leads the Way.

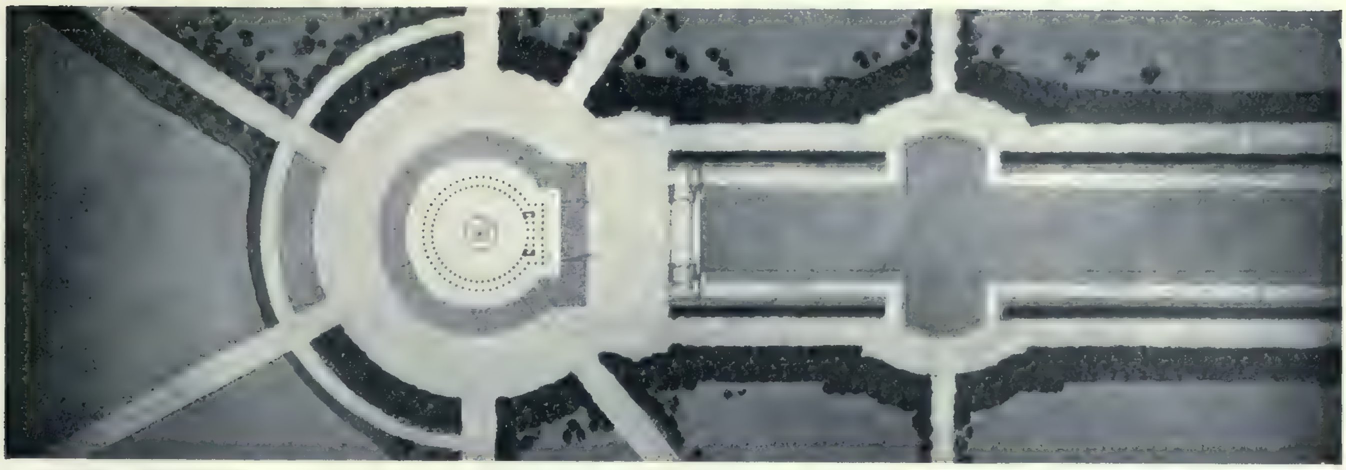
The Los Angeles ordinance differs in many respects from the districting plans of other cities in that it lays the greater emphasis upon the establishment of industrial districts, whereas the schemes embodied in the laws of other States concern themselves with residential districts. The difference, however, after all, is chiefly a question of emphasis.

The entire city of Los Angeles, with the exception of two suburbs, is divided into industrial and residential districts. In addition to the industrial districts there are what are termed "residence exceptions"; in other words, small spots where certain unobjectionable industries are permitted.

The industrial districts vary greatly in shape and size. The largest has an area of several square miles and measures five miles in length and two miles in width. The smallest district comprises a single lot. As a whole the industrial districts are grouped in one part of the city. The "residence exceptions" are small, with the exception of one which is about a half mile in area. None of them covers a greater area than two city blocks, and in many cases each does not occupy more than one or two lots.

The line that is drawn between the industrial district and the residential district in the Los Angeles scheme is that all kinds of business and manufacturing are permitted without restriction in the industrial districts, while in the residential districts certain specified businesses of a distinctly objectionable nature are prohibited. Those industries which are not enumerated in the prohibition are permitted.

In the residential districts all manufacturing but that of the lightest kind is forbidden, but less offensive business and manufacturing



PLAN OF LINCOLN MEMORIAL, WASHINGTON.

establishments which are excluded from the residential districts may be carried on in the "residence exceptions," which seem to be a sort of "twilight zone" between the two extremes.

The Law Retroactive.

A distinctive feature of the Los Angeles scheme is that certain industries, even if already established in the residential district before the district is created, are to be excluded; that is, it becomes unlawful to maintain these industries even though they may have been in operation for many years before the district was created.

Among those excluded are the following: Any works or factory using power other than animal power in its operation, or any stone crusher or rolling mill, machine shop, planing mill, carpet-beating establishment, hay barn, wood yard, lumber yard, public laundry, wash house, coal yard, briquette yard, riding academy, or any winery or place where wine or brandy is made or manufactured.

So much for the California enactment. As it is the only one which has been tested in operation through any considerable period of time and is also one which has been tested in the highest State courts, it assumes especial importance for the rest of the country.

It differs in a number of marked respects from the attempts that have been made in other cities, and before discussing the limitations of such statutes and the essential principles to be observed in formulating them if they are to be sustained by our courts, it may perhaps not be inappropriate to briefly state what has been done in the other states.

In Michigan in 1910 the Common Council of Grand Rapids, without any specific authority from the legislature, passed an ordinance establishing residence districts, and subsequently this ordinance was amended by creating additional residence districts. The validity of the ordinance was attacked in the courts, and the Superior Court of Grand Rapids held that the ordinance was unconstitutional and void, among other reasons on the ground that "such ordinance constitutes a taking away of the property of relator without due process of law, in violation of the provisions of the Fourteenth Amendment of the Constitution of the United States."

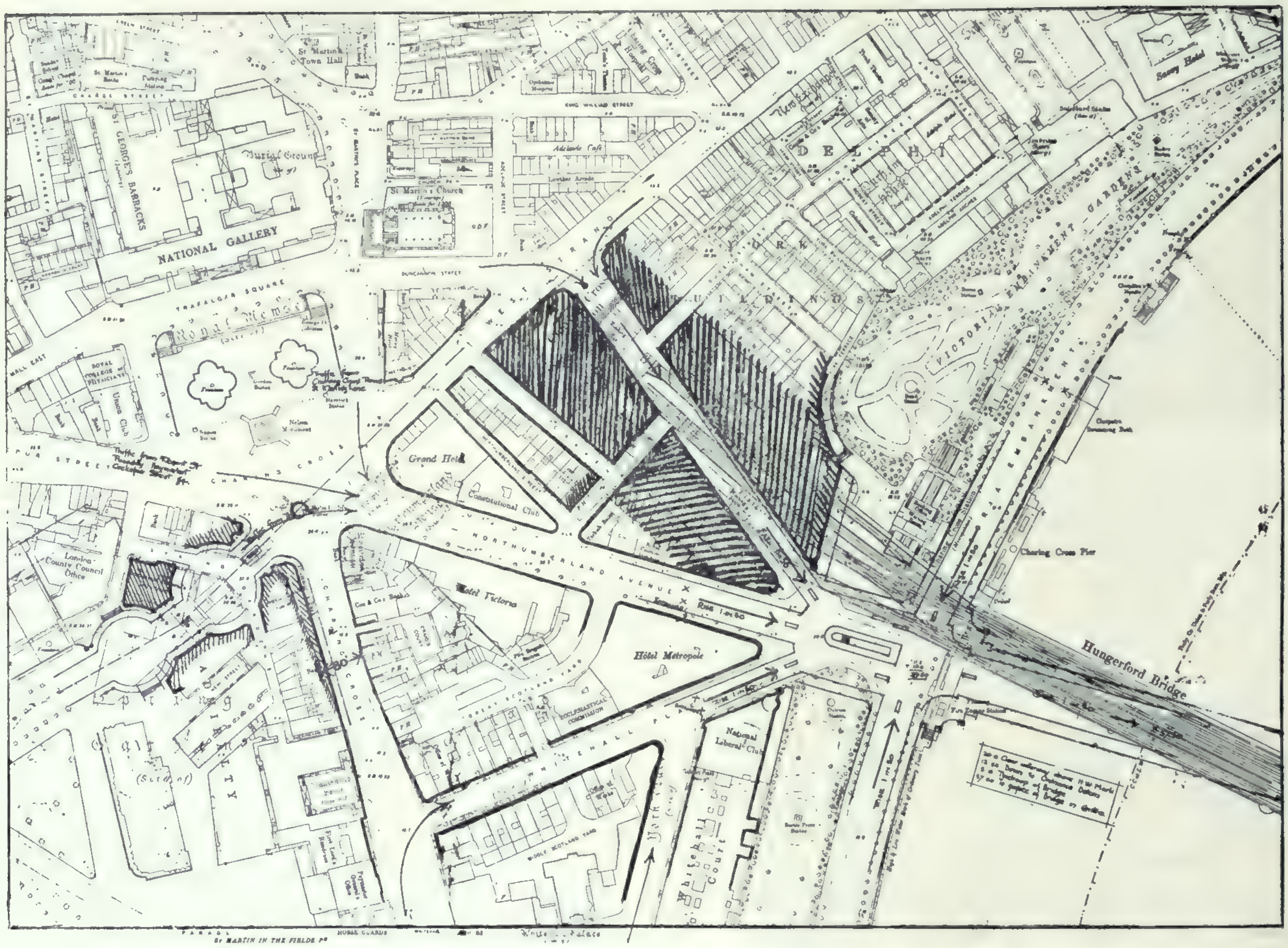
As the court did not advance any reasons for reaching this conclusion, and as the case was not carried to the highest court, and the whole issue was affected by the fact that the Common Council had received no specific grant of police power from the legislature to enact an ordinance of this kind, this decision is of no great value to us except as indicating some of the things *not* to do in grappling with this problem.

The Wisconsin Act.

The legislature of Wisconsin in 1913 (Chapter 743) passed an Act authorizing cities of 25,000 or more to set aside exclusive residential districts. The Act thus affects the cities of Milwaukee, Green Bay, La Crosse, Madison, Oshkosh, Racine, Sheboygan and Superior. Part of the Act reads as follows:

"The Common Council in cities of . . . 25,000 or more are authorized to set apart portions of such cities to be used exclusively for residential purposes, and to prohibit the erection and maintenance of factories, docks or other

STREET IN PASADENA, CAL.



RE-ARRANGEMENT OF CHARING CROSS AND MALL APPROACH. STATION AND BRIDGE TO BE REMOVED AND NEW VEHICULAR BRIDGE TO BE ERECTED.

similar concerns within such districts. Such cities may in like manner restrain the encroachment of business houses upon purely residential districts, require the consent of the majority of land owners and residents of such districts, once improved, before such business is permitted on such streets, and make as low a unit as one block. The power granted may be exercised upon the initiative of the Common Council or upon the petition of ten or more residents in the district or block to be affected." And the Act goes on to say that "the enactment of ordinances excluding factories, docks or other similar concerns from residential districts shall be a final and conclusive finding that factories operated in such district are detrimental to the health, comfort and welfare of the residents of said city."

We understand that under this power the city of Milwaukee either has recently or is about to establish a number of residential districts. Neither the Act nor the ordinance has as yet been tested, so far as we are able to ascertain.

Minnesota Follows Suit.

At about the same time that the State of Wisconsin was acting, the State of Minnesota was taking similar action. The legislature of that State in 1913 passed an Act (Statutes 1913, Chapter 420) empowering cities with a population in excess of 50,000 to establish exclusive residential and industrial districts. This law therefore applies to the cities of Minneapolis, St. Paul and Duluth. Acting under authority of this law the City Council of Minneapolis on February 28, 1913, passed an ordinance establishing certain residential districts. So far as we can ascertain, the validity of this ordinance has not as yet been tested.

The State of Illinois in the same year also passed an Act empowering cities to establish residential districts and exclude therefrom certain other classes of buildings, but this was vetoed by the Governor upon an opinion from the Attorney-General that such an act would be unconstitutional.

As a resident of the effete East, I would not for a moment have you believe that these important efforts in the cause of progress have come only from the Far West or Middle West.

New York State Acts.

At the same time that Wisconsin, Minnesota and Illinois were acting, the Empire State of New York was taking similar action. In the Housing Law for Second Class Cities (Chapter 774 of the Laws of 1913) will be found a similar plan for the establishment of residential districts. In that Act a plan is provided for the establishment of "residence districts," and the erection of any building other than a private dwelling or two-family dwelling in such districts is prohibited. The residence district may be made as small as one side of a city block.

Acting under authority of this law the cities of Syracuse and Utica have passed ordinances establishing such residential districts. Here, too, so far as can be learned, no attempt has been made to test the constitutionality of this provision, though many "sea-lawyers" have rendered horseback opinions, or perhaps it would be more appropriate to say sea-leg opinions, that any such scheme is unconstitutional.

The great city of New York has also taken similar action within the last two months, the legislature of 1914 having passed an enabling Act authorizing the Board of Estimate and Apportionment of that city to divide the city into districts and to regulate the use of buildings in each district on a different basis. A commission is to be appointed by the local authorities of New York City to determine the boundaries of districts and to work out the details of this plan.

Canada the Pioneer.

It would be inappropriate in this presence for me to attempt to discuss what has been done in the Dominion of Canada along similar lines, except to say that I am informed Canada took action in this direction nearly five years before the United States even thought of it. As early as 1904 the legislature of the Province of Ontario amended the Municipal Act by adding thereto a new section known as Section 541-A. This authorized the Councils of cities and towns by a two-thirds vote of the whole Council to pass and enforce such by-laws as they might deem expedient . . . in the case of cities only "to prevent, regulate and control the location, erection and use of buildings as laundries, stores and manufactories"; and later on from year to year the scope of the Act has been enlarged so as to apply also to "stables for horses for delivery purposes, butcher shops, blacksmith shops, forges, dog kennels, hospitals, or infirmaries for horses, dogs or other animals."

It was also provided that the location, erection and construction or use of any building in contravention of any such by-law might be restrained by injunction proceedings at the instance of the municipality; and it was further provided that none of the above provisions should apply to any buildings then erected or used for any of the purposes mentioned so long as their present use continued.

In 1912 this provision was extended by empowering cities having a population of not less than 100,000 to "prohibit, regulate and control the location, on certain streets to be named in the by-laws, of apartment or tenement houses, and of garages to be used for hire or gain."

Acting under authority of this law, the city of Toronto in 1913—and I imagine also even during the present year—has passed a number of by-laws of this nature.

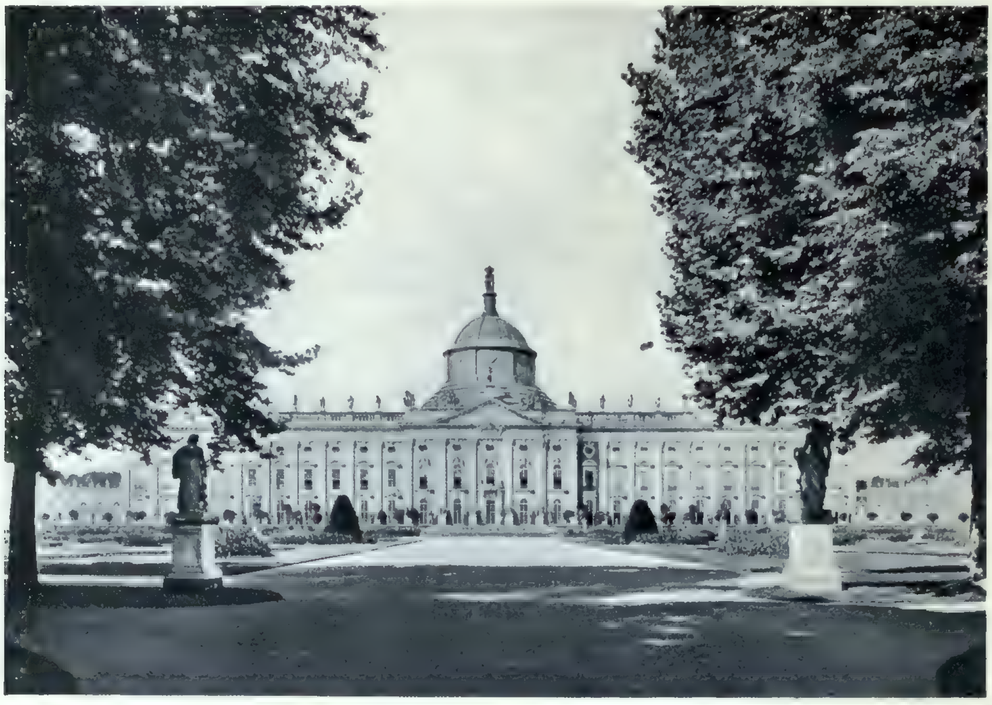
If we include also the general enactment in the building code of the city of Baltimore, State of Maryland, by which it is provided that no permit for the erection of any building may be given by the local authorities without the approval of the Building Inspector and the Mayor that its erection will not increase the fire hazard,

A DESIGN FOR THE IMPROVEMENT OF CHARING CROSS BY D BARCLAY NIVEN & T RAFFLES DAVISON depreciate the surrounding land values or have a disadvantageous effect upon the general welfare of the residents in the immediate vicinity, we have included in our summary of the enactments on this subject all those which the writer, using the most diligent effort, has been able to get track of.

Essential Principles Involved.

What, it may be asked, are the important considerations to be borne in mind in seeking in America to utilize the police power to regulate the character of neighborhoods and to protect citizens in the enjoyment of residential districts free from the invasion of objectionable industries or occupations, and how can we so formulate our enactments that they will not be subject to adverse decision by our courts?

It will be seen from a study of the different enactments that have been described that they differ in many respects and in some essential particulars.



NEW PALACE AT POTSDAM.

In the first place, should we limit the industries or uses which we exclude from a residential district to certain specified ones that may be enumerated in the statute, or shall we prohibit all industries in our residential district and forbid there any use other than for purposes of residence?

In the California law we find that only those industries are excluded that are enumerated, and presumably only those are enumerated which the authors of the law believe can be shown clearly to be objectionable from the point of view of public health, safety, morals or welfare. In the Minneapolis ordinance and in the Milwaukee ordinance the same principle is followed and specific industries are enumerated.

It has become an axiom, however, in legislative experience, that specific enumerations are extremely dangerous, for the very simple reason that the enumerator is apt to forget many points which should be enumerated and may possibly include in the enumeration things which are subject to attack. The California law illustrates this admirably.

In the Los Angeles ordinance it will be recalled that where the objectionable industries prohibited in the residential districts are enumerated we find among other things "any winery or place where wine or brandy is made or manufactured."

The question at once suggests itself, why exclude brandy and permit whiskey?

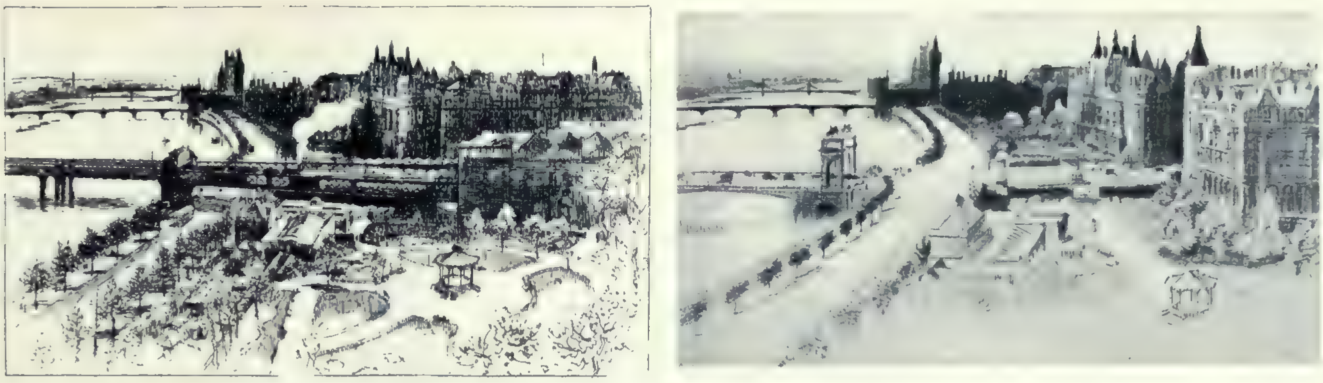
It may be that the author of the law had his individual preferences, but we submit that this should not be a controlling consideration!

Viewed from any point of view, the California enumeration or any enumeration has its weak points. How are we to treat under such a plan the case where a man has invested his money in an attractive dwelling with the idea of permanently living there for the rest of his days; then suddenly he finds his property values injured, the whole character of the street endangered, because someone has chosen to construct a small retail store in one of the houses? One store of this kind leads to another, and within a short time the residences are driven out.

The plan of enumeration would not cover such a case, unless the very general description were used of any place where anything is sold, but that would be too sweeping, as many important business transactions are consummated in private residences.

The writer questions also whether it would be possible in all cases to show that all of the industries enumerated in the Los Angeles enactment are in themselves dangerous to life, health or safety or injurious to the general welfare.

In the New York Second Class Cities Law everything but private dwellings and two-family dwellings and private garages or stables at the rear of the lot is excluded. In this Act no attempt is made to enumerate objectionable industries or objectionable uses of property in residential districts, but all uses other than for



EMBANKMENT GARDENS, LONDON, PRESENT CONDITION AND FUTURE SCHEME.

purposes of residence are by the Act itself excluded.

The Problem of the Multiple-Dwelling.

An important feature of this scheme which should not be lost sight of is carried out in the New York law, namely, the exclusion from strictly private-residence districts of huge multiple-dwellings such as tenement houses and apartment houses and hotels.

A similar objective was evidently at the base of the more recent Toronto enactments, as the ordinance of that city applies to the prohibition of tenement houses and apartment houses and public garages and stables.

None of the statutes which have been cited, neither the ordinance of California nor the laws of Wisconsin or Minnesota, will be of any value in the effort to keep apartment houses, tenements and hotels out of private-residence districts, as the laws of these States simply give to the local authorities in the cities affected the right to differentiate residential and industrial districts. The multiple-dwelling, either apartment house, tenement house or hotel, is of course a residential use of property, and such a building could not therefore be excluded.

It is of very great importance in many of our rapidly developing cities to keep apartment houses and hotels out of the private-residence districts and to discourage so far as we legally can the erection of multiple-dwellings. Notwithstanding its manifest convenience and great advantage from many points of view, the multiple-dwelling is unquestionably a source of detriment to the development of any city and interferes greatly with proper social conditions and the development of true civic spirit. A city cannot be a city of home owners where the multiple-dwelling flourishes.

Of course there are cities such as New York and some of the older Eastern cities where the multiple-dwelling is the chief type of house that we can expect to find at the present day in the future development of the city. Here, therefore, it will be necessary to distinguish between the prohibition of multiple-dwellings and the prohibition of industries. In working out regulations for New York City, for instance, the local authorities will undoubtedly have to deal with this somewhat puzzling question.

Thus we see there is a wide variance in the practice of the West and the East. Which is the better course to follow?

It depends very largely on how far we want to go. If we want to keep a residence district strictly for residence purposes, the method employed in the New York law is more likely to accomplish the result than the method employed in the Los Angeles, Milwaukee and Minneapolis ordinances.

From the point of view of sustaining such an enactment in the courts there is much to be said in favor of the latter provided the industries enumerated can be clearly shown to be injurious to health, safety, morals or the general welfare.

It is interesting and significant to note that the enabling Acts in all three States, namely, Wisconsin, Minnesota and New York, are couched in very broad terms and empower the cities affected to exclude from residential districts practically all buildings other than those used for residences.

STREET IN BUFFALO.

Shall the Law be Retroactive?

The next question which confronts us, and one which is of great moment, is, shall our statutes be retroactive? Shall we reach back into the past and disturb industries or uses of property which have been maintained for many years past? In other words, shall we, after a given date, no matter what the conditions, exclude from a newly created residential district all industries or objectionable uses to which property may be put?

PUBLIC LIBRARY, COLUMBUS.

This has been the method employed in California. It is also the method employed in the Milwaukee and Minneapolis ordinances, but it should be noted that these ordinances in excluding certain industries from residential districts are limited solely to those industries which can be shown to be objectionable from the point of view of public health, morals or the general welfare.

Having, however, once enumerated these industries, they may not be maintained in the residential districts, no matter whether the industries were located there before the district was established or not.

The New York law does not go so far. It does not seek to affect anything but the future. It accepts the principle that, where a district has already gone and industries are well established, it is futile to attempt to save it for residential purposes.

It has seemed to the writer that we would have a far better chance of sustaining such enactments in our courts—certainly in our eastern courts, which are more conservative than those further west—if we limit the enactment to the future and do not seek to attempt to interfere with vested rights and interests already well established in the enjoyment and use of property for industrial and business purposes.

The Property Owner's Right to be Heard.

A third consideration of great importance is, how far the residents and property owners of the district affected by the restriction shall determine whether such restriction shall apply. Here there are two elements of danger.

If the law permits the decision to rest solely with a majority of the property owners affected, there is likelihood of its being set aside by the courts on the ground that one group of property owners cannot deprive another group of property owners of the right to use their property in such way as they may wish.

On the other hand, we must be on our guard not to place the determination of this question solely in the local legislative body or permit it to act without giving the property owners whose interests are affected an opportunity to express their views and have some voice in the determination of the question at issue.

It is apparent, therefore, that both of these elements must be considered. The restriction to be valid must either originate with or have the affirmative approval of a substantial majority of the parties in interest whose property is affected. It must also have the approval of the Government, that is, of the local legislative body.

Geographical Boundaries to be Small.

Another important consideration from the practical point of view, if not so essential from the side of the legality of our plan, is that the plan shall be a workable one and that the geographical boundaries of the district affected shall be such as to give a scheme that will not unduly stop the progress of a city nor interfere with the development of business where business development is necessary and desirable.

It is because of the recognition of these considerations that it has been found necessary, as I understand the experience of Germany also indicates, to make the unit of the district extremely small. As has been already pointed out, in California the unit has sometimes been a single lot, and this is the case in some of the German cities.

For American practice the best unit seems to the writer to be one side of a city block. Anything larger than this is bound to cause trouble. It will not do to make the entire city block the unit of our residential district, because it is well recognized that we have in many cities conditions where one side of a block located on some broad avenue is best adapted for business purposes; in fact the only development that could be appropriately and profitably made at a given time on such a location is of that nature, whereas the other three sides of the block may be located on distinctively residence streets, and the most appropriate use for them is a residential one.

With the unit thus limited to one side of a block, it is possible to give to each part of a city the special treatment that it needs,—business in one case, residences in another.

Another important consideration from the point of view of workability is that the plan shall be flexible so that the industrial progress of the city may not be checked. It ought to be possible, therefore, to have the restrictions that are imposed removed or removable by as simple a process as the one by which they are imposed, and even in a residence district where the restrictions are in full force and effect it should be possible, especially in those cases where all industries are excluded, to permit certain industries with the consent of a substantial majority (two-thirds or more) of the owners affected and where the establishment of the industry is also approved by the local legislative body.

Attitude of the Courts.

Thus far the plan to establish residential districts has been tested in but few cases. The Los Angeles ordinance—the most drastic of all, and the pioneer as it happens—has been tested in three important cases, all of which went to the highest court in the State of California, the Supreme Court of that State. In all these cases the law was strongly sustained. The cases are important ones. They are known as

THE MUSIC GALLERY, PARIS.

THE WALTERS MUSEUM, BALTIMORE.

ex parte Quong Wo (161 Cal. 220; 118 Pac. Rep. 714).

ex parte Montgomery (163 Cal. 457; 125 Pac. Rep. 1070).

ex parte Hadacheck (132 Pac. Rep. 589).

In all of these cases the court took so broad a view of the police power and laid down principles of such far-reaching moment to all American cities that one is tempted to quote at length from these decisions, but limitation of time does not permit. Those who are interested in this subject will find in the references cited a most interesting study.

In the first case, that of *Quong Wo,* the issue involved was the right of a Chinese laundry to be maintained in the residential district. The laundry had been there for many years before the district was established, but the court held that the industry could no longer be maintained.

The *Montgomery* case involved the right of a lumber yard to be maintained in a residential district. Here again the ordinance was sustained and the lumber yard discontinued.

In the third case, the *Hadacheck* case, the industry involved was that of a brickyard. Here the petitioner was able to show that the land contained valuable deposits of clay suitable to the manufacture of bricks and much more valuable for brickmaking than for any other purpose, that the owner had through the entire period of his ownership used the land for this purpose and had erected on it the kilns, machinery, etc., necessary for such manufacture, and that the brickyard had been established at that location for a number of years prior to the establishment of the residential district.

Notwithstanding this strong position of the industry affected, the court held that it could not be maintained longer in the residential district and that the ordinance was valid. In its decision the court said that the police power was not only for the suppression of nuisances, but that "it extends to and includes the regulation of the conduct of all business and the use of property to the end that public health or morals may not be impaired or endangered."

These striking and important decisions, sustaining and broadening our conceptions of the police power, have been a source of great comfort and encouragement to the writer of this paper, who, however, has had his buoyant optimism somewhat diminished upon being informed by some of his legal friends in the East that it is not safe to follow the decisions of the California courts, as they are not esteemed highly by the legal fraternity. We trust that this may prove to be a sectional and narrow view of fundamental principles of human liberty.

The Canadian enactments, I am informed, have also been tested before the courts as to the validity of the by-laws, which have in each case been sustained, though no case has been of sufficient importance as yet to warrant its being carried to the higher courts. In the United States no case has gone to the United States Supreme Court.

So much for the decisions sustaining laws of this kind. Two adverse decisions have also been had. The one in the case of the Grand Rapids ordinance already referred to and tested only by a local court, and a more recent decision with reference to an ordinance of this kind enacted by the city of Chicago without specific grant of power by the legislature, where an effort was made to prevent the establishment of retail stores in a residential district under the general nuisance power (Ill. Supreme Court, People *v.* City of Chicago, 103 Northeastern Reporter, 609).

To Sum Up.

I think it must be evident to the unprejudiced observer, from a consideration of the above facts, that a new use for the police power has been discovered and that it *is* possible to protect residential districts from the invasion of objectionable industries and to preserve to the inhabitants of those districts the enjoyment of their homes and property under rational conditions of human existence.

In seeking legislation of this kind, however, there are certain important considerations which should be followed if we wish to succeed.

First, we must have a broad enabling grant of power from the legislature authorizing the individual city or a group of cities to establish residential districts.

Second, we may prohibit outright in such residential districts all uses of property except for strictly residential purposes, or we may enumerate certain industries that we desire to have excluded from such districts.

Third, if we desire to exclude large multiple-dwellings such as tenement houses, apartment houses and hotels from private-dwelling districts, we must so draw our enactment as to exclude everything other than private dwellings or two-family dwellings, or we must exclude such multiple-dwellings by specific enumeration.

Fourth, wherever we make any specific enumeration of industries that may not be permitted great care must be taken to enumerate only those which can be shown to be injurious to health, safety, morals or the general welfare.

Fifth, it is better not to make our laws retroactive, but to concern ourselves only with the future development of the neighborhood.

Sixth, we must not place the final determination with regard to the establishment of districts solely in the hands of the property owners affected, nor on the other hand must we leave it solely to the local legislative body. Both elements must have a right to be heard in the determination.

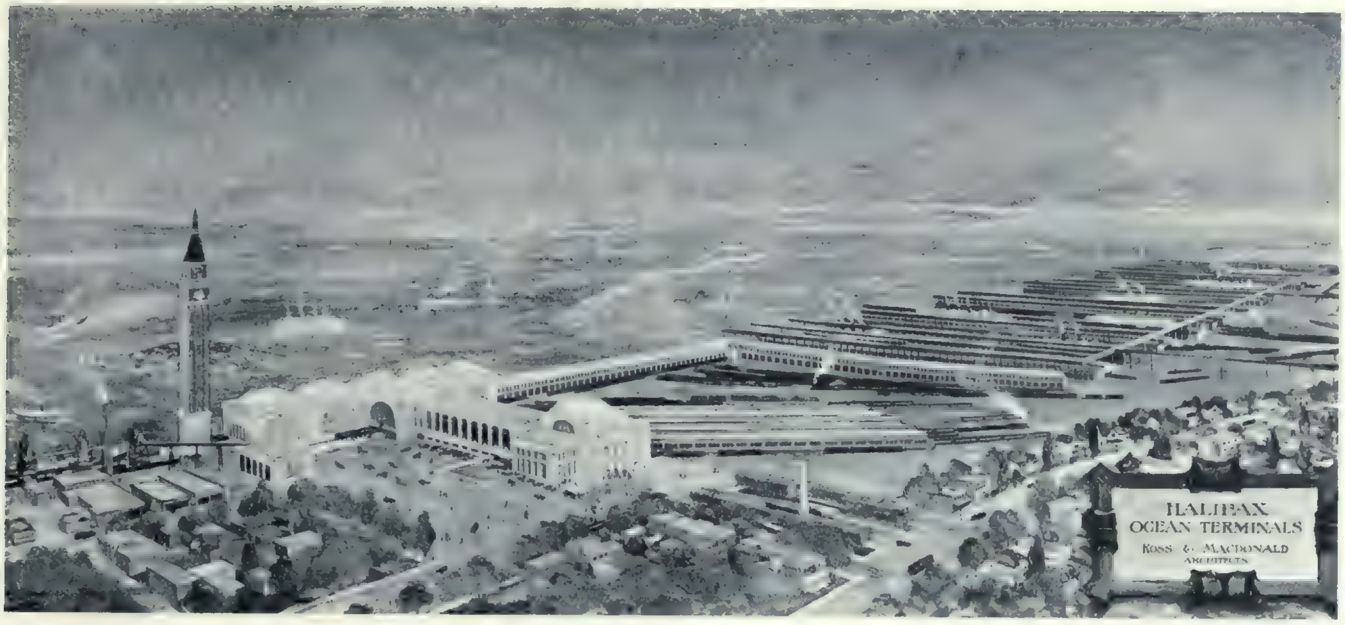
Seventh, the geographical boundaries of the district must be small so as not to interfere unduly with the commercial development of the city.

Eighth, the plan of operation must be flexible and the restrictions imposed removable by as simple a process as the one by which they were imposed.

If these considerations are followed it is believed that laws of this kind can be made even judge-proof.

WHAT CITY PLANNING IS.—City planning is an effort to promote urban efficiency by the closest practicable adaptation to function in the city's every part. Such adaptation involves pleasantness of aspect because the city serves life and is a home as well as a workshop, and it involves physical and social fitness as well as commercial and industrial efficiency, partly because there could not be maximum economic efficiency, without such aids.—*Charles Mulford Robinson.*

WHY CITY PLANNING PAYS.—However varied and successful the industrial activities of a city, the basis of its continued prosperity and the most vital community dividend which its manifold energies are producing is a citizenship content with its standards of working and living. It is good business to increase directly this community dividend. It is good business to decrease the cost of mantaining and extending the city's plant by putting an end to wasteful processes.—*Flavel Shurtleff.*



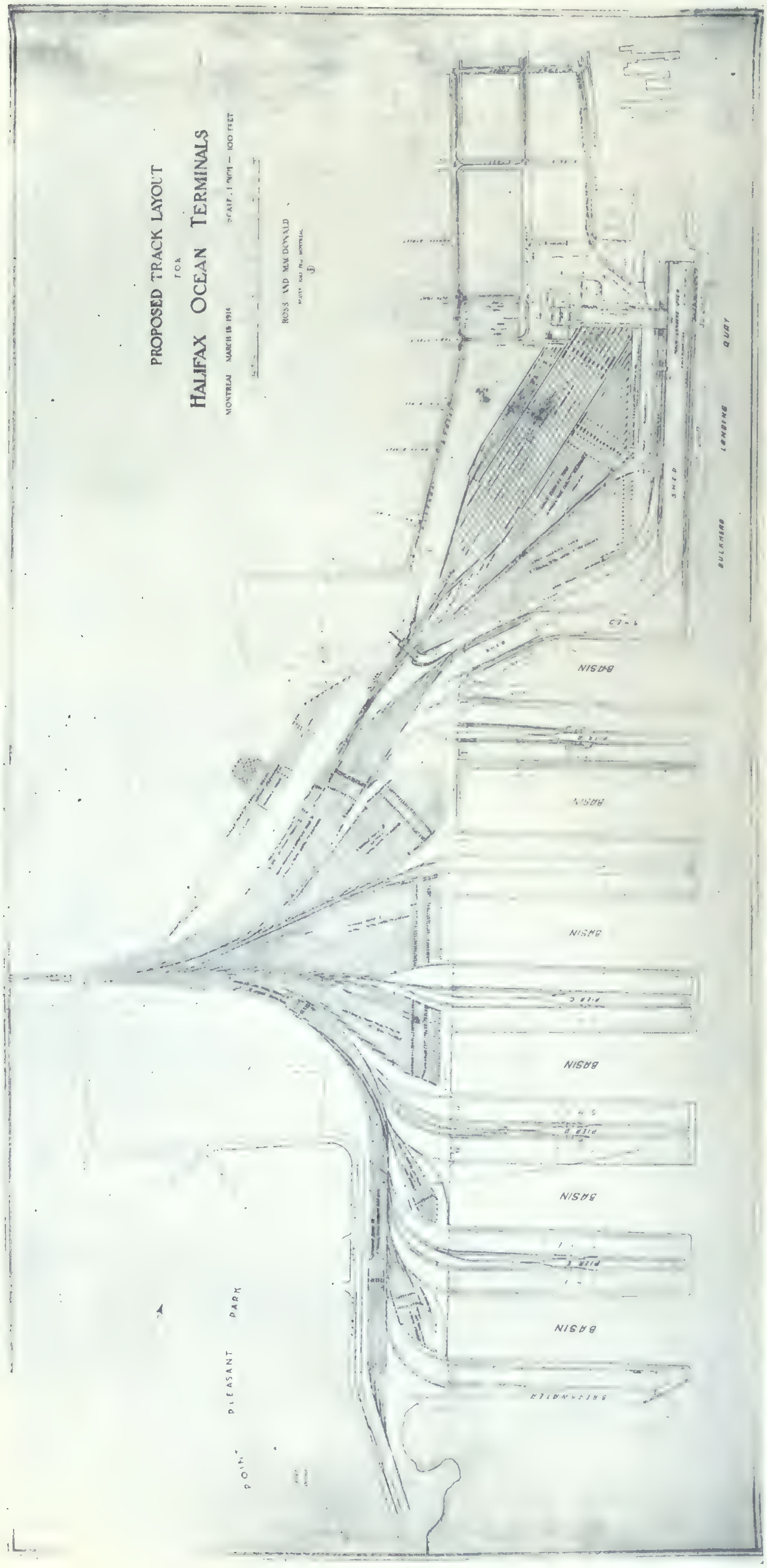
Halifax Ocean Terminals

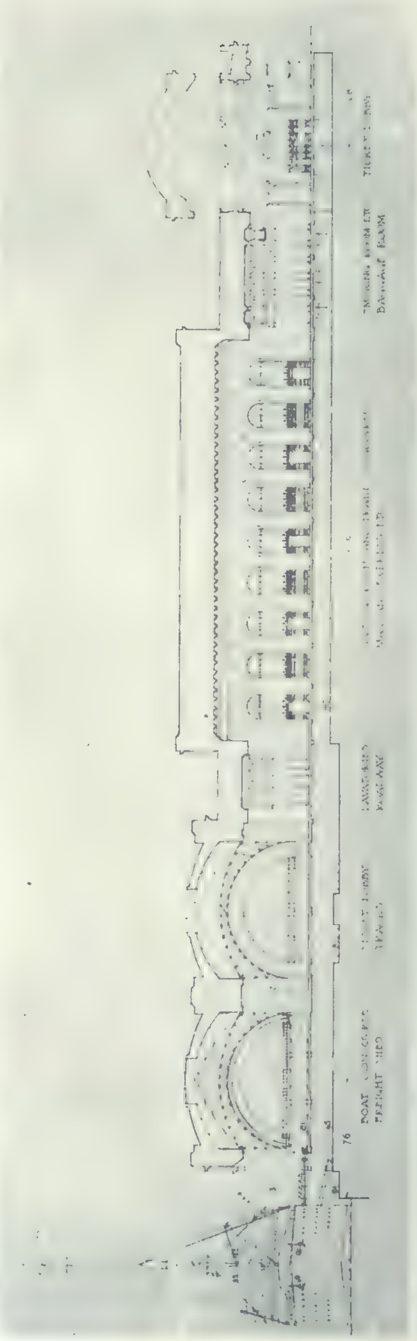
GENERAL preliminary plans in connection with the new ocean and railway terminals at Halifax have been submitted by the architects, Ross & Macdonald of Montreal to the general manager of the Canadian government railways. These plans illustrate the general arrangement for the handling of passengers and freight and the facilities provided for the transferring of passengers, baggage, mail and express to and from railway trains and steamships as well as for the provisions for the handling of local Halifax city traffic.

The general scheme consists of a passenger station building in the shape of a large letter "T," the foot of the "T" being at the shore end, and the head at the steamship landing stage. The shore end of the building provides accommodations for the local Halifax traffic and contains ticket offices, baggage and parcel checking rooms, restaurant and lunch room, women's and men's retiring rooms with toilets, and provision on the upper floors of the building for office space required by the railway and steamship lines. This portion of the building which will be known as the Halifax City Station will face on a plaza located between South and Tobin Streets, the plaza extending from Pleasant Street east to the front of the station building about 400 feet in depth. A place for cabs is provided on the north with access to baggage checking room and to ticket lobby. Passengers on entering the building will find all the facilities they require for transacting their business, after which they may pass on to the train concourse or train waiting room.

The general plan provides a landing stage approximately 2000 feet long, which is divided into three parts, the northerly third being set apart for the active handling of passengers baggage, mail and express, the remaining two-thirds being devoted to the handling of cargo. It is upon this northerly end of the landing stage that the top position of the "T" shaped building is placed.

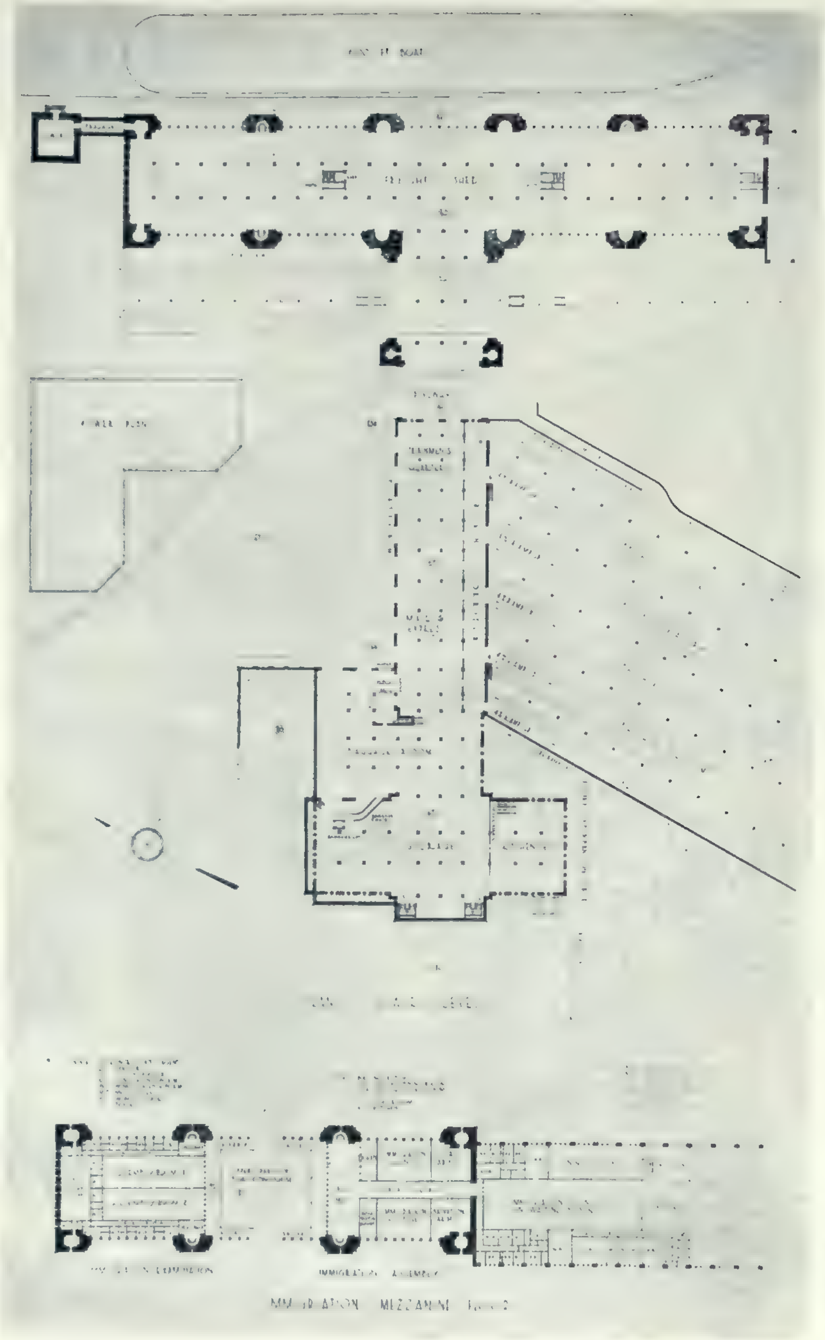
Passengers disembarking from steamships, will enter the building at the second story level. Passengers' baggage will be discharged at the same level and will be distributed in the usual way for customs examination. After baggage has been passed by the customs and then checked by the railway company it will be transferred to the floor below by means of chutes or elevators to a distributing baggage room from where it will be routed to cars according to destination. Mails will be discharged directly from the steamship to the lower level of the steamship passenger building to a distributing mail room from where they will be transferred to cars according to destination. After passengers have landed and passed their baggage through the customs they will enter into a booking hall containing ticket offices for the railway and steamship lines. Here they may obtain railroad checks for their baggage, secure their tickets and attend to other matters of transportation which they may find necessary. They will then pass into the train concourse or train waiting room, which room connects the steamship station with the Halifax City Station and forms the stem of the letter "T" as stated above. The train concourse is designed for the common use of the Halifax city traffic and the steamship passenger traffic. The floor of this room is placed on a level with the second story of the steamship passenger building, and is also level with the ticket lobby floor of the Halifax city station. The



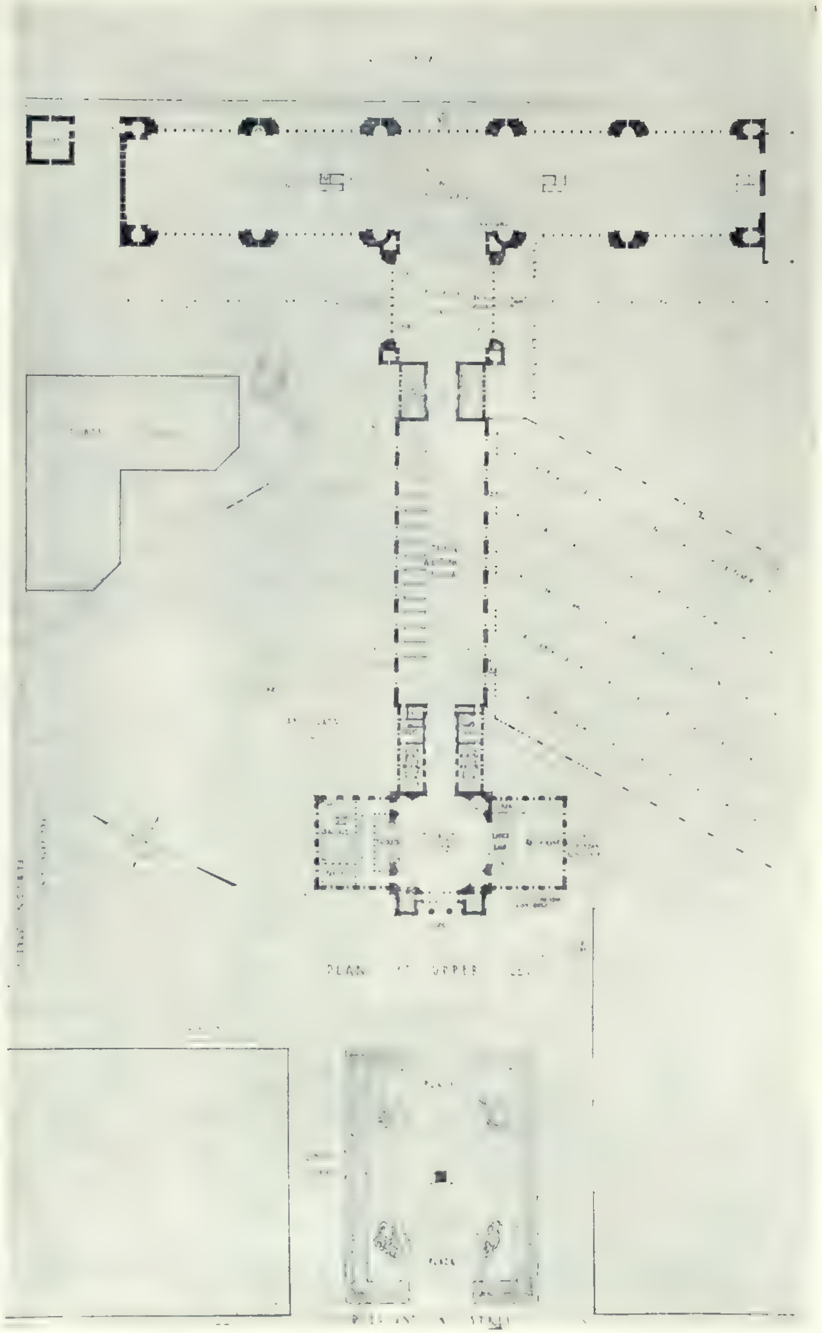


ROSS & MACDONALD
ARCHITECTS.

HALIFAX OCEAN
TERMINALS,
HALIFAX.



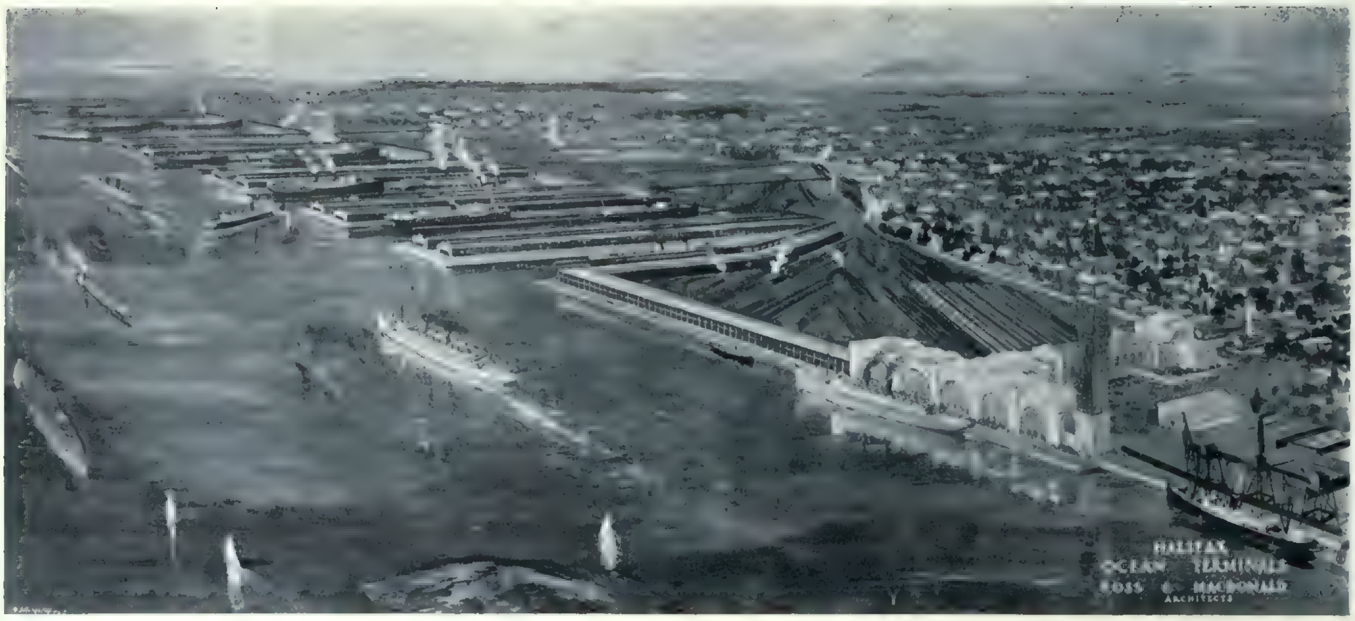
PLAN AT LOWER LEVEL.



PLAN AT UPPER LEVEL.

PLAN OF UPPER AND LOWER LEVELS, HALIFAX OCEAN TERMINALS.

ROSS & MACDONALD, ARCHITECTS.



passengers' platforms of the train shed are placed at a level between the train concourse and the baggage room beneath. All stairways have been eliminated between the train concourse level and the passenger platforms, the people reaching the platforms by means of easy inclines. Separate tracking platforms for baggage trucks are provided and these connect with the baggage room beneath the train concourse by similar inclines but separate from the passenger inclines thus avoiding all confusion between passengers and baggage.

Large provisions are made for the large number of immigrants which are expected to come through the Port of Halifax while detention rooms and offices are provided for the various Government officials connected with the immigration work, as well as separate lounge rooms, lunch rooms, sleeping rooms, toilet rooms etc., for the immigrants themselves. These rooms are not directly connected with the other portions of the station building.

The general arrangements contemplate the erection of a separate power house for the furnishing of heat, light and power for all the buildings connected with the terminal project, a grain elevator for the handling of grain from cars to steamboats and large track provisions for handling of freight to and from the pier sheds.

The construction of the sea walls of the landing stage and the first pier has been let and the work is now under construction. The architects are at present preparing plans for all the work in connection with the buildings to be placed upon these piers. The use of local materials is contemplated as far as possible, including granite, sand-stone, brick and concrete.

CITY PLANNING AIM AND PROCEDURE.—City planning is the name given to the science and the art of providing for the most practical and agreeable development of a city or town. It would prevent the recurrence in newer districts of the mistakes of the older. It would profit by that which time has proved worth while in the experience of any city. It would diagnose the troubles of a community from all points of view; social, political, economical, esthetic. It would prescribe the remedy best suited to the particular needs of the case, with a view also to preserving the individuality of the community. It would determine the relative urgency of the various needs, and plan a consistent programme of procedure covering every phase of the subject. It would concentrate on these matters in turn and get concrete results. *George B. Ford.*

CITY PLANNING.—City planning is the orderly adaptation of all parts of a city to their proper function. It involves governmental foresight and control. The logical essentials of city planning are: 1. The districting of the city into zones in which buildings may be of various heights or number of storeys, and cover a varying proportion of th site; i.e., the determination of the cubage or volume of buildings. 2. Street construction and surface and subsurface maintenance. 3. The provision of cheap, safe, rapid and comfortable means of transportation for passengers. 4. The restriction of the location of factories, and the provision of means of handling freights and of docks and harbors in coast towns. 5. The reservation of sites for parks, playgrounds, open spaces, public buildings, etc. 6. The incorporation of adjacent territory.—*Benjamin C. Marsh.*

Rapid Transit

Provision for Future Rapid Transit: Subway, Elevated or Open Cut, and Their Influence on the City Plan

JOHN VIPOND DAVIES

THE title assigned to me as the subject of this paper introduces such limitations that it is necessary to some extent to break away from a strict adherence to it in order to obtain a little perspective which one is unable to get at close range.

The term "Rapid Transit" itself, as applied to the great problem of city passenger transportation, has come to be used with the idea that it will provide the solution of all the difficulties of travel incident to the concentration of population in the great cities, while it is essentially only one element in this great problem. The title of this paper, "Provision for Future Rapid Transit," etc., appears to indicate that the city plan under consideration has not yet reached a point where so-called rapid transit is necessary or essential, and that, therefore, the actual need has not yet been reached; consequently, it would appear that to consider such a subject, the logical way must be to obtain the conditions that have been reached in great cities which have attained a position requiring such facilities, and to work backward through the development period in order to arrive at what should be considered for the future needs of an embryo city.

The development of all big cities of the world has been dependent on transportation. The early cities were, with hardly any exception, built on waterways where the water furnished the means of transportation, and even in the development of New York City, the original city plan was laid out with the east and west streets running between the North (Hudson) River and the East River at frequent intervals, because the means of transportation was by those rivers, and the increased facilities for inter-communication from side to side were considered of superior importance to the longitudinal movement which it was then believed would always remain upon the waters of the North River and East River.

When we consider that the first practical locomotive engine (The "Rocket," built by George and Robert Stephenson) made its first trip on October 6th, 1829, and that the first railway operating as a common carrier (The Liverpool & Manchester Railway) was opened January 1st, 1830; and that Fulton's first steamboat was only built in 1807, we can appreciate how short a time it has been since this whole question of modern transportation has come forward for consideration.

At the present time, and entirely apart from water transportation, there have developed various classes of the transportation business, and these various classes are inseparable and cannot be considered in any way excepting in their relation one to the other.

It is not the purpose of this paper to consider at all the question of freight transportation, but at the same time, that portion of a railroad's business is inseparable from the operation of what is commonly known as the "steam railroads," irrespective of the fact that in a number of instances, owing to local conditions in and about big cities, steam is being replaced by electric power for operating purposes. Nevertheless, the so-called steam railroad is as different in its characteristics from the so-called rapid transit proposition as the latter is in turn distinct from the surface street railroads. It is the primary function of the steam railroad to connect the populous centre with the outside world, thus providing the means for subsisting, and supplying a concentrated population in a limited area, and the steam railroad brings the city into touch with the outer world and brings the outer world to the city, and yet at the same time such steam railroads can, and must continue to, handle a very large share of what is usually described as rapid transit business, and such rapid transit service is one of the functions of the steam railroad within suburban territory.

The function of the street surface railroad is that of distribution within limited areas of the population, and as the population spreads and the distance and time for distribution become greater, it is obvious that a point is reached in the evolution of a city when some means of quicker and more rapid handling of passenger service becomes necessary, in order to extend the radius and area of the urban district for distribution of the population over a greater territory.

It is well, at the outset, in considering a subject of this kind, to understand clearly what transportation is to a community and no statement will make this more clear than to say that in countries like Canada and the United States the investment in, and magnitude of, the business of providing and operating transportation facilities are second only to the agricultural industry, and far in advance of any other industries whatsoever; and while this applies to countries like Canada and the United States, it applies far more so in countries where agriculture is of less importance than it is on this continent.

Our very existence depends on transportation and the ability of our cities to expand under modern conditions of business necessities as the first requisite, passenger transportation, and obviously in every great city the amount of time consumed in travelling by each individual to and from his place of business, constitutes an excessively large percentage of his total day. There should, therefore, be allowed only a reasonable portion of the day for the actual travelling to and from the place of business, and the average speeds of transportation by the different classes of transit facilities, given hereinafter, will be instructive and helpful in arriving at an understanding of the territory which can be properly served by a street surface system before there becomes any necessity for the introduction of rapid transit service. A city in its beginning is merely a village, and as the original owner of the property has to give up a certain land area for the first thoroughfares, and as the town expands more and more land has to be given or acquired for public necessities of streets, the problem which we most have to consider in connection with the rapid transit proposition is not so much the original planning of the village, but the replanning after the city has grown to such proportions that its residents consider that they have reached the period at which they are entitled to more and better transportation service. This is the case when the travelling distance and the time taken in daily travel by an adequate mass of resident and commuting public, warrant the heavy expenditures necessary to produce such facilities. It is impossible in the early days to phophesy what the development of a city will be, and Washington, which is one of the few cities of the world that have been laid out in the beginning on a definite plan, has proven that what was anticipated on the original layout to be the commercial centre of the city, has developed very differently. There is, however, one thing which is certain and that is that the centre of development of the commercial district of a city will be permanently fixed by the transportation facilities which can be provided to the district, as only by such transportation facilities can the commercial population of a city be daily moved inwards and outwards, and in order, therefore, to retain a commercial district within a city, it is of prime importance to provide it with all the various classes of transportation service which will enable it to attain that position and to retain it with all the changes which may come about in the city's development.

PONT ROYAL, PARIS.

In the early days of a city's growth real estate may be of comparatively little value, and yet to provide broad streets and open spaces in the early days of such a city's development may be a very costly thing in the end, and it may prove very much cheaper and most satisfactory to wait until the growth of a city has proved its necessities and then, at higher prices, purchase such rights of way and property as are needed for replanning purposes, than in the first instance for a community to burden itself with an investment for such purposes, even at a comparatively small price, and carry the interest charges on such an investment throughout the city's growth. This is conspicuously illustrated by the fact that if the $24, which was paid by Governor Minuit to the Indians for the whole Manhattan Island, could have been invested at compound interest, it would have now reached a value of over $400,000,000.

In the evolution of a great city it sometimes occurs that districts in different localities, often at considerable distance apart, by reason of racial characteristics, business relations or otherwise, necessitate direct inter-communication in no way related to the commercial centre, and consequently the provision of through arteries of travel connecting such districts, becomes desirable, for which no anticipatory city planning will have provided. The general and usual necessity, however, for rapid transit is undoubtedly on radial lines to and from the commercial district and the outlying residential or manufacturing districts, although, as population distributes there becomes a necessity for such service across these radial lines, though there is not the same urgent necessity for high speeds of operation.

Because the development of a grown city has proved its original plan to be inadequate, it is not by any means an indication that such planning or development has been haphazard. One of the troubles with us is that we are trying to solve in a decade the whole transportation problem of cities which have required hundreds of years to build up.

There is no question that for any of the various types of structures to provide rapid transit facilities, broad and straight streets, passing through the commercial centre of a city, are not only of great advantage, but they are practically essential and necessary, both for the growing necessities of the surface traffic and for the installation of such structures as are needed for the later rapid transit facilities.

In the more detailed consideration of the types of structure for providing for rapid transit, the presence of the original steam railroads on private rights of way at surface grade, must not be lost sight of. They have been the means by which the village has arrived at the rank of a city and attained the dignity of having under consideration the question of rapid transit, and one of the first necessities will be the treatment of, or reconstruction of, that steam railroad. All our large cities are actively engaged in that work. In Europe they had a different proposition, for when these steam railroads were built the cities were already old and established, and there was present assurance of business accruing. Consequently, in Europe, the railroads were for the most part constructed on masonry viaducts above the grade of streets or on solid embankment. Had such expensive methods been necessary here, the roads might never have been built and many of our big towns would have remained villages. The proper treatment of these grade elimination problems is very complicated and largely dependent on local topographical conditions, but the treatment of such should have prior rights over any new development solely for rapid transit purposes, because the steam railroad problem is less elastic and much more limited by operating and construction conditions than a purely rapid transit road handling passenger service. In any case, in the reconstruction of such steam railroads in relation to the replanning of a city of the first rank, they should never be considered for installation of less than four operating tracks; so as to enable them to take their place in the evolution of the rapid transit needs, and the structures should, as far as possible, be by masonry viaducts or in open cut, whether the depressed line remains open or is covered over. If steam engines operating through service are requisite factors, then the improvement should be open, but if it is of sufficient magnitude to warrant installing electric power, then a covered subway is desirable. At the same time, elevated steel structures have been successfully used and for the Atlantic Avenue Improvement in Brooklyn (Long Island Railroad), owing to the inability to finance a subway throughout, I devised a composite scheme, taking advantage of the topographical conditions existing, in part subway

PONT DE L'ALMA, PARIS.

and in part elevated railroad, which has worked well. In this connection it is worthy of note that it does not necessarily follow that adjacent property will appreciate in value by such elimination of grade crossings. These improvements are of immense value to a community and reduce risks of personal damage and remove necessary, but real, nuisances, but in the case of the Atlantic Avenue Improvement in Brooklyn, or Railroad Avenue, Jersey City (Pennsylvania Railroad), or numerous other such instances, there has been little evidence of any real property improvement.

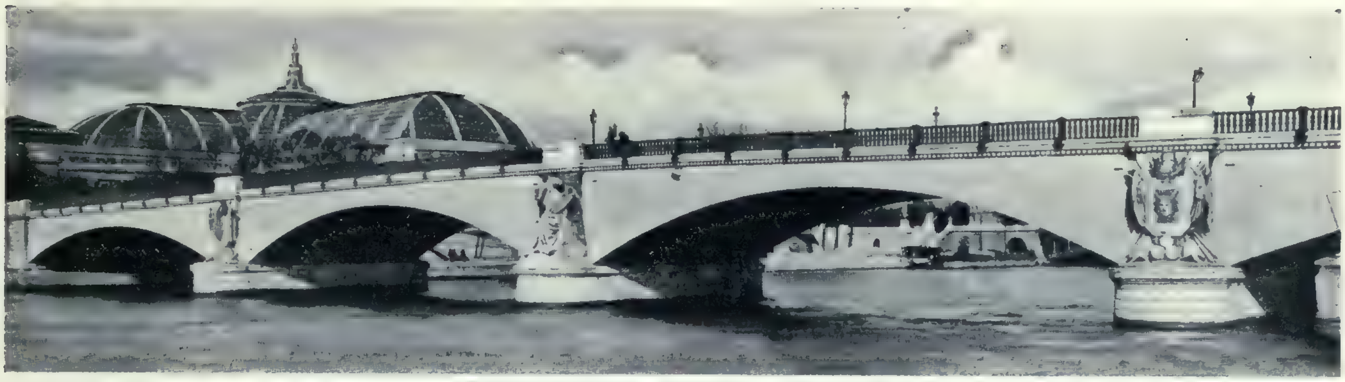
The provision for new rapid transit railroad construction, whether undertaken by public funds or by private capital, must be considered on practical lines with consideration of the cost and value of the types of construction, concentration of population, and general topography of the city and territory to be served.

Generally speaking, it can be assumed that a properly built railroad track, whether on the surface, or viaduct or steel structure, or in subway, is capable of doing only the same passenger business, or, in other words, can serve to operate the same number of persons per hour; and, further, that the operation and maintenance, including depreciation and all other charges, will, if a road is doing a reasonably full business, use up about 45 per centum of its gross income; the remaining 55 per centum being available to pay the interest charges on the capital invested. It, therefore, can readily be seen how important it is with light traffic, to keep the cost of construction and equipment low, considering that for a complete operating structure, such as the Interborough Rapid Transit Subway in New York, consisting in part of subway and in part of elevated structure, it is necessary to haul more than 2,000,000 pay passengers per annum per mile of single track to meet fixed charges for structure and equipment; or, as an illustration, a road which would cost, for structure alone without equipment, say $500,000 per mile of double track, would have to haul at a 5-cent fare, 910,000 pay passengers to pay interest charges on its expenditure for that structure, and, if equipment were included, would have to haul probably 1,400,000 pay passengers per annum.

PONT AU CHANGE, PARIS.

It will help materially in this consideration to have clearly stated the approximate relative costs of producing different structures, and the following figures are given as average costs for construction of structures and the installation of structural equipment, but without power or rolling stock. They do not include the value of property for rights of way or easement and are given on the basis of constructing a double track railroad in each case, although reduced to the cost per mile of single track:—

Types of structure	Cost per mile of single track.
Trolley railroad in suburban district, either on public roads or private right of way where no paving is required; complete with overhead trolley construction, track bonded; all in operating condition ....$	25,000
Trolley railroad on city streets, including asphalt or granite block pavement for width of tracks and 2 feet outside of tracks; complete with overhead trolley construction, track bonded; all in operating condition	41,500
Underground trolley railroad in congested streets of a city, including necessary pavements, conduits, etc., and with reasonable allowance for changes of subsurface improvements:	
New York	126,500
Washington	48,500
Elevated railroad of a type and for the loading permissible to meet requirements of Public Service Commission; complete with stations,	



PONT DES INVALIDES, PARIS.

contact rail, ties and track; averages	113,000
Railroad in open cut similar to Sea Beach Railroad of Brooklyn Rapid Transit Company in Brooklyn where work is executed with steam shovel and with concrete walls; averaging cost of bridges and stations as part of the cost; complete with contact rail, ties and track; averages	225,000
Railroad on masonry viaduct filled in with stone ballast, similar to structures now being erected on Queen's Boulevard from Queensboro Bridge to Greenpoint, on Long Island, New York; complete with stations, contact rail, ties and track; averages	330,000
Subway such as the 4th Avenue Subway in Brooklyn where work is unaffected by subsurface improvements, where the digging is easy and can be done with steam shovel and under typical ideal conditions, complete with structural and track equipment; averages	402,000
Subway such as the Broadway Subway now being constructed in New York City, where the work is very difficult and involves extreme interference with subsurface improvements of all kinds, the support of street surface, trolley car tracks, underground trolley construction, etc.; complete with structural and track equipment; averages	1,190,000
Iron lined tube tunnels under waterways or below water level; complete with structural equipment and track; averages	2,700,000

In connection with the above table of costs, the difference in the first cost of constructing improvements in a city like Washington, where the soil is advantageous to excavate, where the streets are broad, and where there is no difficulty in changing subsurface improvements, is in marked contrast to the cost of executing similar work in a city like New York where the material to be excavated is most difficult, where the streets are congested, and where there are numerous and extensive subsurface improvements to be cared for.

In the matter of speed of operation of improvements under these varying conditions, it is well to bear in mind that for street surface railroads in congested portions of great cities, the average speed does not exceed 8 miles per hour. In the less dense districts of a city this speed is increased to 11 or 12 miles per hour, but the average speed for street trolley railroads in cities will not exceed 9½ miles per hour. Similar electric trolley service in outlying districts on private right of way will average somewhere between 12 and 15 miles per hour. Local service on elevated railroads or subways or in open cut, with stations approximately 1,200 feet apart, will operate at an average speed of about 15 miles per hour. Express service on subway or elevated railroads or in open cut, with express stops spaced about 2 miles apart, will operate at an average speed of about 25 miles per hour, while steam railroads operating

PONT DE LA CONCORDE, PARIS.

rapid transit suburban service, with stops at longer intervals, have an average operating speed of 30 to 35 miles an hour, depending on the district served and the frequency of stops.

The spacing of stations on any type of rapid transit railroad is an important factor as affecting train operation and development of the district. The demand by operating railroad officers, in the interest of the general travelling public, is to increase the length between express stops and so increase the average speed, and, at the same time, to throw increased and more equitable burden on to the local lines. On the other hand, the constant demand by real estate promoters is to ruin the entire high-speed express service by introducing frequent stops on the express lines, thereby, to a large extent, reducing the express service to a little better than is provided by the local trains.

PONT DE ALEXANDER III, PARIS.

For the best operation and to stimulate growth in outlying districts, no high-speed service should have stations at nearer intervals than 2 miles, and preferably 3 or 4 miles, in the territory immediately between the concentrated commercial centre and the outlying suburban sections.

The increase in travel in relation to the population of cities, as illustrated by New York, indicates the growing necessity for constantly increasing facilities by all classes of transportation service. In New York City in 1860, by all means of public conveyance, there were only 43 rides per head of population per annum. In 1870 this figure had increased to 100; in 1880 to 150; in 1890 to 230; in 1900 to 247; in 1910 to 322; and the most recent figures indicate about 360 rides per head of population per annum during the last year. Somewhat similar figures hold good for Paris, London and Chicago, and to a large extent this increase has been occasioned by the increased transportation facilities provided for the public.

The various types of structures which have been developed for rapid transit service include:

1. *Tube Tunnels*: In cities where the underlying soil is sand, clay, silt, or other water-bearing material, below tidal or river levels, or under conditions where construction must be carried on without breaking the surface of streets, tubular tunnels, usually carrying a single track within each tube, are built by use of a shield and the lining constructed of cast iron or steel segmental plates. This type is used also for passing under rivers or waterways where no other type of structure is equally advantageous. The great advantages consist in the ability to construct on any alignment without breaking through the surface, so that work may be carried on in crowded districts with entire ignorance on the part of the public that any work is in progress. The type has, in operation, practically all the advantages the subway has, and is a self-contained structure, having excessively thin walls and consequently can be utilized in narrow thoroughfares and in the worst conditions of soil, and, under those conditions can be made strictly watertight.

2. *Subways*: By subway is meant construction in the open of a railway below surface grade and the structure covered over so as to restore intact a continuous street surface. According to the difficulties of construction, this type may be more or less expensive, but even in the cheapest form, with ideal conditions, the cost of producing such structures is so great as to warrant its being used only in districts where the population has reached a condition of practical saturation, or in commercial districts where the population has to enter or leave in large numbers. There is no doubt that the subway provides ideal means for conducting transportation under such conditions where the cost can be afforded and where the volume of traffic warrants. It is exempt from all difficulties due to climatic conditions. The equipment is protected and there are no interferences from exterior conditions. The surface of the ground or of the streets remains intact and is free for any development required for street conditions. The extension of subways into deep level tunnels provides almost

endless possibility for the development of rapid transit to the utmost limits of the city's growth, as tunnels may be constructed in tiers, one below the other, and irrespective of local surface topography; and, as a matter of fact, can be located without regard to street locations by passing under private property upon easements for transportation purposes only. Before this point is reached it may be necessary to evolve a better understanding as to the value of easements at depths below the surface where the surface property is not in any way interfered with or disturbed, which will enable a railroad to acquire such easements at reasonable cost and expense and thereby enable it to construct lines for high speed rapid transit service at reasonable expense. In the ultimate growth of the greater cities these lines will become of increasing advantage, as thereby means can be provided for stations in congested districts, and, by dipping down to considerable depth, such a railroad can be extended to the suburban district for many miles without coming near the surface to interfere with any other development, and so produce a truly express rapid transit service.

3. *Open Cut*: The open cut method of construction of rapid transit facilities necessitates gravity retaining walls and construction at a depth which will permit highways to be bridged over such open cut. This method of construction has been used extensively in many cities and places for the elimination of grade crossings of existing railroads. It has an advantage over a subway in the matter of first cost due to the fact that usually such work can be constructed with steam shovel, if on private right of way or where the intersecting thoroughfares can be obstructed. There is an advantage in this type of rapid transit facility in that it gives to passengers natural light and fresh air, which is not the case with subways. At the same time, in northern climates, there is the disadvantage of being exposed to and interfered with by extreme conditions of weather. One great advantage of this type of construction over an elevated railroad is the comparative quietness with which the railroad service can be operated, and since the modern electric motor and railroad car have reached a point reasonably near perfection, the elimination of any further noise is a most desirable feature, and is one of the directions in which engineers are now working to improve transportation facilities. The extension above the retaining walls of an open cut structure of solid fences, reduces the noise effect so that an electric train operating in the open cut is quite unnoticeable. Such a structure, however, must of necessity be located on private property.

4. *Viaducts*: As above stated, the development of viaducts with masonry and solid fills, was the earliest type of construction of steam railroads through European cities. As applied to a street, it is very questionable whether it is a desirable type of structure, as the masonry and piers have of necessity to be very massive, and unless the street is of extreme width, it forms a serious obstruction to the ordinary surface uses of such a street. A masonry structure, properly designed, may be artistic and improve materially the appearance of a thoroughfare if it is broad enough, but for a private right of way, such a masonry structure or solid embankment, with bridges for the intersecting streets, is advantageous and desirable, particularly on the ground of quietness and low maintenance cost. At the same time, it is open to the ordinary conditions of weather which a surface line is exposed to.

PONT NEUF, PARIS.

5. *Elevated Railroads*: The elevated railroad, constructed of steel, serves a function which it would be difficult to replace. The first cost of such a structure is reasonable and its application to surface conditions is remarkably easy.

A solid track floor of reinforced concrete increases somewhat the cost, but reduces the noise and probably reduces somewhat the cost of maintenance. The principal objection to a steel elevated structure has been due to the fact that many of these structures have been erected on very narrow streets where the structure itself comes within a few feet of the houses on either side. In a broad thoroughfare and as a structure axial to the street, there is very much less objection to this means of providing transportation. To the traveller this mode of transportation is particularly desirable, since he gets the full benefit of light and air while travelling. Notwithstanding the usual objection to these structures, the record in New York and Brooklyn has been that property values have appreciated and have maintained their appreciation to a greater extent than nearby and adjacent properties where no such elevated structures exist, so that it can only fairly be assumed that there is no material property disadvantage in the construction of such an elevated railroad. The great function served by the elevated structure is to enable a railroad to be constructed which does not interfere with the use of the street surface and provides rapid transit operation at the smallest cost, and thereby enables suburban districts and districts of light population to obtain the advantages of rapid transit service which they could not hope to obtain if the alternative was the construction of subways or masonry viaducts.

Let us grant that close access to the congested sections of a city is necessary by the steam railroads doing rapid transit passenger service. Then equally the urban and suburban rapid transit service must likewise come into that close touch also. These means of transportation through the heart of a grown city must be provided, for the most part, within the limits of streets or public property, and such streets must be both numerous and wide. This may be best appreciated when we think that on completion of the present plans there will be entering the point of New York between Chambers street and the Battery, no less than thirty-four single track lines of rapid transit railroads.

When we consider that the ground plan of the central portion of practically all great cities was determined before these modern means of transportation were invented, it is no wonder that no provision was made for them in the plans. The consequence has been that these facilities, being provided after the city has developed along the lines of its original plan, necessitated the construction of such facilities either over or under existing thoroughfares, or on additional paths on purchased property, requiring the demolition of buildings or other structures along their routes. This has been an expensive and inconvenient method of providing such facilities, not only due to the inconvenience during construction, but to the fact that all business has to adjust itself to these changed conditions, and the provision of each new railroad changes by its operation all the previous conditions of development, and in itself, and due to its operation, necessitates reconsideration of the entire subsequent problem.

The former Rapid Transit Railroad Commission of the City of New York endeavored to lay out sufficient rapid transit routes to provide for the city's needs for all time to come, but these lines were scarcely laid on the map before it was necessary to amend and change them, adding additional routes where needed and abandoning other routes which under no circumstances could be woven into an adequate system.

To develop a city plan for future needs of rapid transit must presuppose the provision of such property, as may properly be needed for such development, in accordance with one or other of the types referred to above. During the city's period of growth the existing steam railroads will have been amply adequate for the long haul and rapid transit business, and such street surface lines as growing necessities demanded will have been provided and expanded as occasion required for the general local distribution of the business; and the question arises when will the period of the city's growth warrant other development of rapid transit service, either by private or public capital. No city, so far, has attempted such development whose population has not exceeded a million; and several of those cities which have tried it have found the attempt unprofitable to the investor though doubtless advantageous to the owner of real estate. Looked at in whatever way, whether from the point of view of investor or taxpayer, this is essentially a business proposition and should be considered on a business basis. The introduction in the past 15 years of electric power for propulsion, has advanced greatly the rapidity of such developments. New York started in 1875 when its population, now included within the territory of the Greater City, was 1,700,000, to build elevated railroads, operated with steam locomotives, by private capital, and for years they were a financial failure. Brooklyn followed suit at a later date, about 1885, and managed to survive for several lean years until the territory served grew and extended and the saturation of population reached a point where the income was adequate to pay returns on the investment. Numbers of cities have worked out plans whereby the street surface railroads can be taken off the surface through the congested sections of the city, with considerable benefit to the public and with largely improved average operating speeds, but not always with profit to the investor. No two cities or propositions are alike and each must be considered on its own merits.

Looking to the future, a city must, therefore, provide in its early growth such broad main arteries, radiating from a central district, as will be adequate to care for such transportation facilities as are needed. As the city grows and extends it is the better fitted and able to carry the burden of providing the broader thoroughfares in the various belts for the constantly growing necessities, and always bearing in mind that as the rapid transit facilities need to be increased, the modern motor truck and automobile traffic on the surface is constantly putting more and greater burdens upon the thoroughfares themselves, which have to be cared for.

The problem we confront is not so much city planning as "city re-planning," to care for changing conditions as well as growth and development. Such re-planning should aim, as far as possible, to provide not only for the usual convenient rectangular plan of streets but also for the broad avenues passing through in various directions the commercial district of the city. The re-planning should, so far as possible by such provision of thoroughfares to accommodate rapid transit facilities, aim to increase the area of that commercial district as much as possible so as to eliminate to the greatest degree, consistent with easy conduct of business relations, the fearful congestion in small areas which exists in London and New York and makes the rapid transit problem so difficult of solution. Easy and quick transit facilities are the only means whereby this desirable result can be obtained.

In considering the period of a city's growth when such facilities are to be provided it must be remembered that the investment must include not only construction but also equipment, which item may amount to from 50 per centum to 100 per centum added to the construction cost, and that the earnings must pay interest on the aggregate expenditure; consequently, there must be sources of concentrated traffic and changes in the passenger load (short haul) in order to yield adequate returns. To obtain this result the more surely, a balanced load obtained by a haul passing through a commercial district to terminal points at opposite ends of a city, is most desirable. This was illustrated best by the extension of the first subway in New York to Brooklyn, by which the traffic was increased vastly, out of all proportion to the increased mileage.

The streets of our great cities to-day are what they were before motor vehicles and power transportation were invented, and we have adequate widths on our main thoroughfares for the surface uses, and yet the public seem to expect that these new conditions can be met and solved at once, although no engineer would be willing to prophesy what the transportation means and methods will have advanced to in the next 20 years. Our problem requires procedure on true engineering lines, with careful working out of plans for each city on its own particular merits and for its individual needs, without political or private real estate interference and influence; bearing in mind that so far as cost will permit it is desirable to eliminate any obstructions in public streets, but if such are necessary to meet the case, that there is little objection if the thoroughfares are broad and commodious.

NORMAN SHAW
MEMORIAL AT
NEW SCOTLAND
YARD, LONDON.

DESIGNED BY
W. R. LETHABY.
MODELLED BY
HAMO THORNYCROFT.

CONSTRUCTION

A · JOURNAL · FOR · THE · ARCHITECTURAL
ENGINEERING · AND · CONTRACTING
INTERESTS · OF · CANADA

FREDERICK REED, Editor

H. GAGNIER, LIMITED, PUBLISHERS
Corner Richmond and Sheppard Streets,
Toronto - - Canada

BRANCH OFFICES:
MONTREAL—171 St. James Street
NEW YORK—156 5th Avenue

CORRESPONDENCE.—All correspondence should be addressed to "CONSTRUCTION," Corner Richmond and Sheppard Streets, Toronto, Canada.

SUBSCRIPTIONS—Canada and Great Britain, $3.00 per annum. United States, the Continent and all Postal Union countries, $4.00 per anum, in advance. Single copies, 35c.

ADVERTISEMENTS—Changes of, or new advertisements must reach the Head Office not later than the twentieth of the month preceding publication, to ensure insertion. Mailing date is on the tenth of each month. Advertising rates on application.

CONTRIBUTIONS—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and duly returned.

Entered as Second Class Matter in the Post Office at Toronto, Canada.

Vol. VII Toronto, September, 1914 No. 9

CURRENT TOPICS

OWING to the unsettled conditions due to the European War, it has been regretfully decided to postpone for an indefinite period the Seventh General Annual Assembly of the Royal Architectural Institute of Canada, which was to have been held at Quebec, Que., on 21st and 22nd September, 1914. Alcide Chausse, Hon. Secretary.

* * *

VANCOUVER CIVIC CENTRE, 1914.—The committee appointed by His Worship Mayor Baxter invite competitive designs for the development of the proposed Civic Centre. Premiums amounting to $500.00 and $250.00 will be awarded to the designs placed first and second respectively. The award will be made by independent experts, whose decision shall be final. All designs must be delivered not later than November 30th, 1914. Programme of competition and plans may be obtained from the Secretary, Vancouver Civic Centre Committee, care of Board of Trade, Vancouver, B.C.

UNTIL quite recently it was believed to be impossible to make cement water-proof. The Ceresit Company, however, now claims to have a mixture of cement which is absolutely waterproof and has given some rather remarkable demonstrations of the efficiency of its material. The most spectacular of these tests will be made in the Palace of Machinery at the Panama-Pacific International Exposition where the company is erecting a beautiful temple of the Water God Aquarius. The temple is surmounted by a spraying fountain and the water-jets will cover the dome and fall into a hidden gutter along the base of the top and then down the hollow supporting the columns. These are faced with glass on four sides so that the water passing down the cement tubes may be plainly seen. The structure is composed entirely of the Ceresit mixture and the company claims that it will be able to prove to the millions of Exposition visitors that the cement is absolutely waterproof.

* * *

"Massachusetts is still bending a thoughtful brow over the ruins of Salem. Everybody agrees that the one thing which contributed most to the spread of the fire was—shingles. House after house burst into flame the instant the rain of sparks touched the tinder-like shingle roofs. A dry, weathered shingle makes about the finest kindling known. In a closely populated town, a brisk wind carries flames over shingle roofs as fire sweeps over sunburnt prairie grass. The Bay State is using the Salem fire to start a strong argument against shingles. It will do the rest of the country no harm to listen."

The above is an excerpt of an editorial appearing in The New York Evening *World*, and calls for serious attention from everyone. Of the few unaffected buildings within the fire-belt practically all were covered with asbestos roofing. It should prove a potent factor in the use of fireproof shingles handled by the Canadian H. W. Johns-Manville Co., Ltd.

* * *

"CERTAINTY"

is what is sought for by everyone. With the Architect and Engineer this is particularly true

The Dietzgen Instruments and Materials are manufactured in our own Factories under the discipline of establishing Accuracy and Dependability; always with the idea of the exacting purpose for which they are intended, and not simply as merchandise to sell—to co-operate and verify with exactness the thought behind their use.

EUGENE DIETZGEN CO., LTD.,
116 Adelaide St. W., Toronto.

CONSTRUCTION

October, 1914 Vol. 7, No. 10

CONTENTS

EDITORIAL 365
War and its irreparable loss to the architecture of Belgium and France.

ARCHITECTURAL MONUMENTS IN THE WAR ZONE OF FRANCE 367

HOSPITAL FOR SICK CHILDREN, TORONTO 379

COPPER ALLOY AS A RETARDANT OF CORROSION IN METAL LATH .. 382

PROGRAM FOR NEW PARLIAMENT BUILDING AT CANBERRA 387

CURRENT TOPICS AND TRADE NOTES 389

Full Page Illustrations

CATHEDRAL AT RHEIMS, FRANCE—Exterior .... Frontispiece

CATHEDRAL AT RHEIMS, FRANCE—Interior 366

H. GAGNIER, Limited, Publishers
GRAPHIC ARTS BLDG., TORONTO, CANADA
BRANCH OFFICES
MONTREAL NEW YORK

969.

THE CATHEDRAL AT RHEIMS, FRANCE.

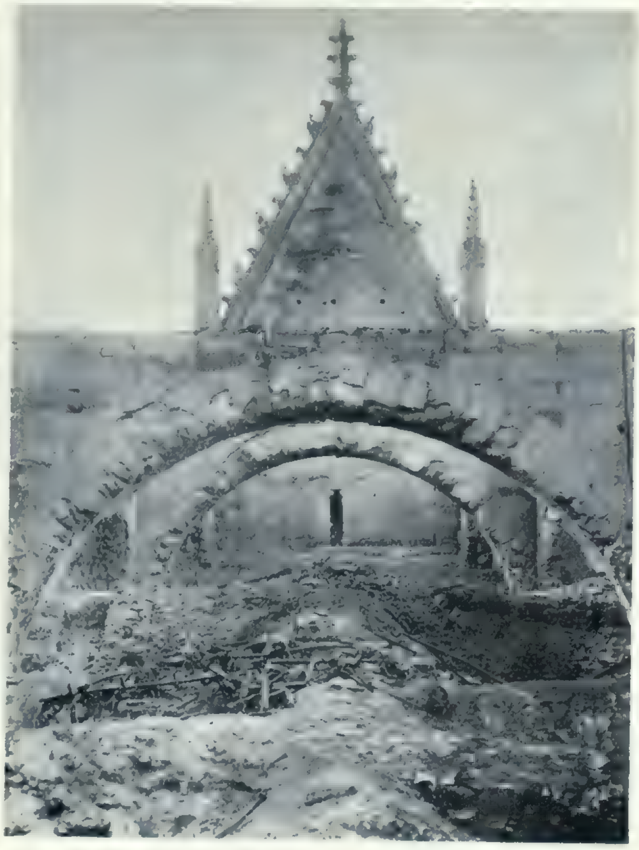
EDITORIAL

The terrible disaster which has befallen peace-loving Belgium, also Northern France—Our duty in the face of this irreparable loss to architecture.

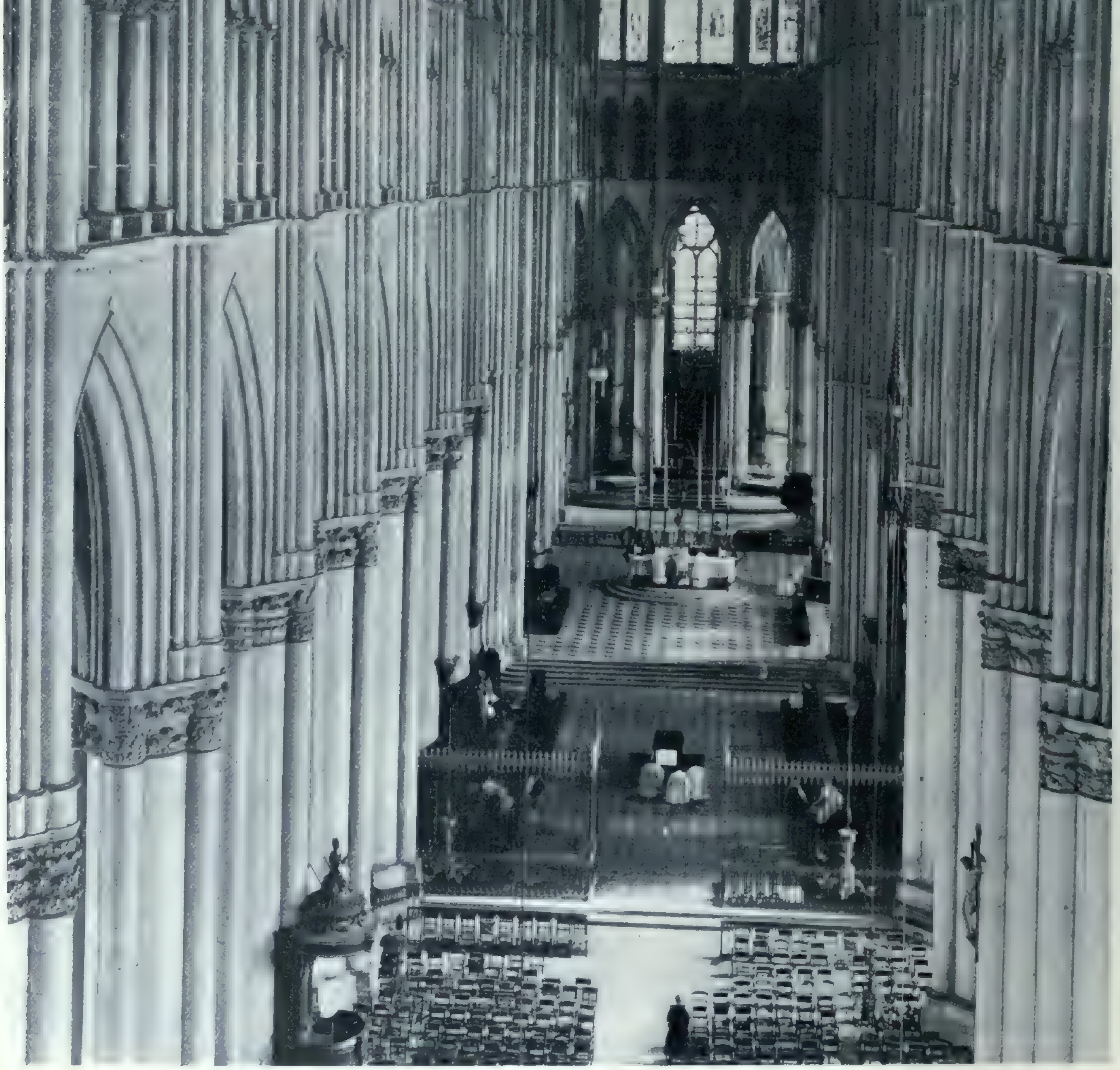
THAT peace-loving Belgium should be the battle field of the European nations is regrettable. During her early struggle for existence she always maintained a right of self-government and escaped the feudal system so prevalent in neighboring countries. The middle ages found her people industriously extending their commercial trade; amassing wealth while others consumed themselves by crusades or feudalistic strife. It was at this period when individualism rose to its highest plane and developed in Belgium the greatest civic architecture of Europe, an art which might have evolved itself into the noblest of all ages had they escaped the Spaniard who destroyed their liberties in the sixteenth century. And hardly a week goes by without the announcement of a city being bombarded and destroyed—all of which tells a tale of ruin to the esthetic creations of a peaceful people.

It is also unfortunate that the route of the German army in France encompasses the territory wherein are found so many beautiful cathedrals. Erected about the thirteenth century, it can hardly be expected that these vast edifices will escape the terrific bombardment of fighting millions. Picture for a moment the wide sweep of battle array and consider the alignment of cities famed for their ecclesiastical structures. Abbeville, Amiens, Rouen, St. Quentin, Noyon, Laon, Soissons, Rheims, Chalons, and Toul, reaching from the western shore line of France to the eastern boundary touching Germany directly north of Paris. Whether these monuments of an illustrious age are destroyed by Germans or the French themselves, it matters little—our only thought is the irreparable loss to posterity of such ennobling works of God and man.

Sorrowful though we may be over the needless destruction of an architecture which can never be replaced and which has proven a source of great inspiration to us all—still we are forced to come back to the one question: if we cannot help it—and we are powerless—what is our duty now? And the conclusion seems to be: "Smile, and while you smile another smiles, and soon there's miles and miles of smiles, and life's worth while because you smile." Be optimistic even though it hurts. Take the spirit of the largest brick industry in the Dominion. At a large sacrifice to themselves and purely from a motive of humanitarianism they are keeping their men at work. This means the storing of vast supplies at an increased expense, but rather than see the men who have stood by them suffer, they are assuming this added burden. Such an action is worthy of the highest commendation and establishes a precedent worthy of all business concerns. In the end their just consideration of all employees will prove to be a wise step. With the war over and the light of prosperity flooding our country from one end to the other, they will be able to meet the heavy demand for building materials. Do not forget that the bravest are not always on the firing line. Sometimes they are planning to keep others alive instead of aiming to kill.



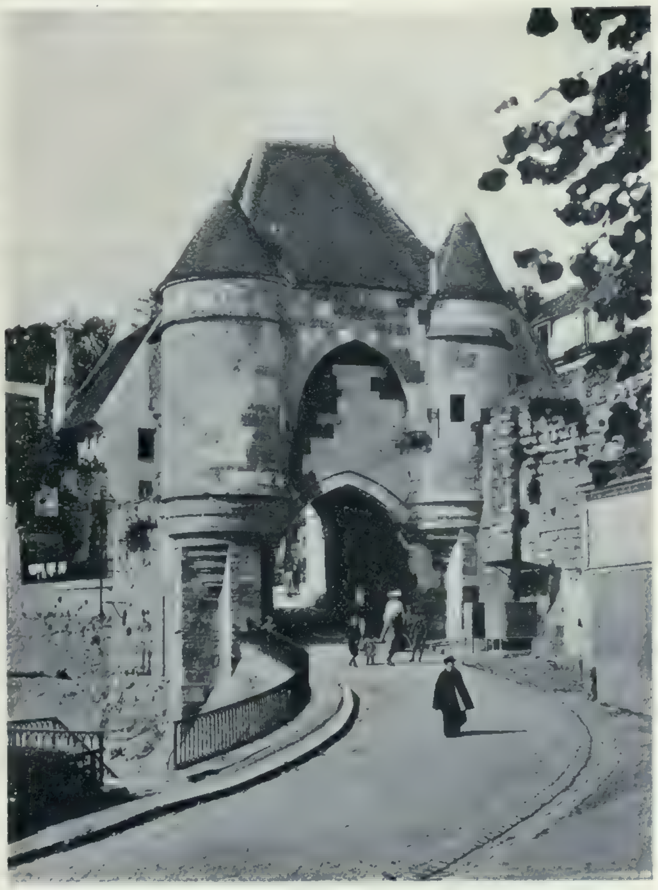
RHEIMS CATHEDRAL. DAMAGE TO ROOF BY WAR SHELL.



NAVE OF CATHEDRAL,
RHEIMS, FRANCE.

Architectural Monuments in the War Zone of France

HARDLY had the peaceful peasants of northern France realized that a vast horde of Germans were passing through their country on their victorious march to Paris, when they were brought to feel that this same host were being driven back again. But at what an irreparable loss to art and to civilization! Settled by the Gauls in the sixteenth century B.C., this territory has had one continuous struggle for existence. After the Roman Empire held sway the Franks established themselves and ruled down to Charlemagne's time, 800 B.C., at which period the Frankish Empire went to pieces and prepared the way for Feudalism. Then came wars with England, Germany and Spain, all of which wrought havoc to every phase of art. From the loss in former struggles it is heartrending to contemplate the final results of the present war upon the well-known monuments of architecture reared in all parts of northern France.



THE GATE OF ARDON, LAON.

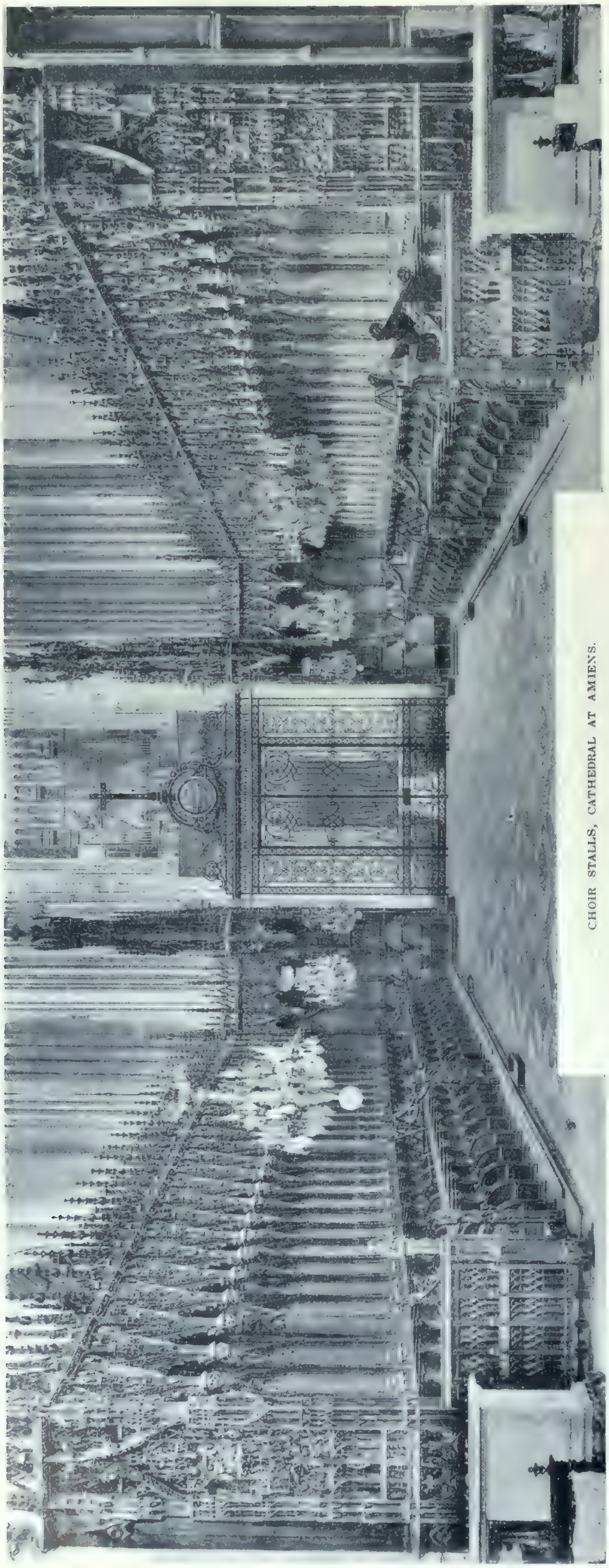
No country is more charming or full of interest than that portion which is forming the battle-ground between the Germans and French. From Abbeville to Nancy are scattered ancient castles, magnificent cathedrals, artistic gardens, and picturesque homes. It is impossible to handle in this short article more than one phase, and in doing that it can only be done in a general way. Up to this time little damage has been done to the ecclesiastical work except at Rheims but events may yet bring about a complete destruction to many of these famous buildings, the marks of genius in an age absolutely foreign to the commercialistic trend of modern life.

While the picturesque town of Abbeville is scarcely included in the war zone, nevertheless it is the first in the line of cathedral cities, stretching across northern France and may yet feel the effects of the present struggle. Fortified during the reign of the Frank kings, it retains the old landmarks of yesterday. The quaint market place is enclosed with high pitched gables of varying colors. The cathedral, St. Wolfran, is late Flamboyant and commented upon by Ruskin as a wonderful proof of the fearlessness of living architecture. The nave consists of bays having a high clerestory and a triforium screened by rich sixteenth century carving; the ribs of the vaulting falling without imposts or break of any kind.

This region contains many half-timber houses which have proved an inspiration to architects in this country. The work of the fourteenth and fifteenth centuries possess an individual charm and are especially well built as evidenced by their present condition. It is regrettable that the people of today are erecting modern homes in this section, as the towns are fast losing their quaint picturesque character. Many of the old houses are so twisted out of shape that it is remarkable how they hold together. The example shown at Abbeville is known as the house of Francis I and shows one of the many which still exist in all cities and towns of Normandy.

As some one has said: "The great difficulty in attempting to describe the architecture of France during the glorious period of the 13th century is really the *embarras de richesse.*" Of the thirty some first class cathedrals erected during this period the war zone covers a large number. The edifices at Paris and Chartres which might have been seriously effected are not considered, but rather those north which raise their majestic spires from the eastern boundary to the western shore.

Notre Dame at Amiens, started in 1218 after the plans of Robert de Lugarches, is likened to one of the chief gems in the incomparable religious jewel box of France. It is one of the largest churches in the world, measuring four hundred and sixty-nine feet long, two hundred



CHOIR STALLS, CATHEDRAL AT AMIENS.

and thirteen feet across the transepts, one hundred and forty-four feet across the doorway and one hundred and forty-two feet high to the crown of the vaulting. Upon the interior there are one hundred and twenty-six slender pillars which narrow as they ascend, making the vaulting appear wider than the floor. A feature of unusual interest are the choir stalls comprising four hundred subjects and presenting more than three thousand six hundred and fifty figures. Surrounding the choir is an ambulatory with an admirably carved stone screen and seven apsidal chapels. Upon the exterior the building exhibits the same grandeur and finished workmanship. The main facade is flanked by two unfinished towers of the thirteenth and fifteenth centuries and dominated by the slender sixteenth century spire over the crossing rising to the height of three hundred and sixty-seven feet. In addition the front has three deep and sumptuously decorated porches as well as a superb rose window one hundred and fifteen feet in circumference. The cathedral is celebrated for its beautiful details and sculpture work; the west facade containing so many scriptural events that Ruskin has titled it the "Bible in Stone." A striking feature upon the interior is the vastness of the fenestration which gives one strong blaze of light typifying the splendor of the heavens through the deep blue glass.

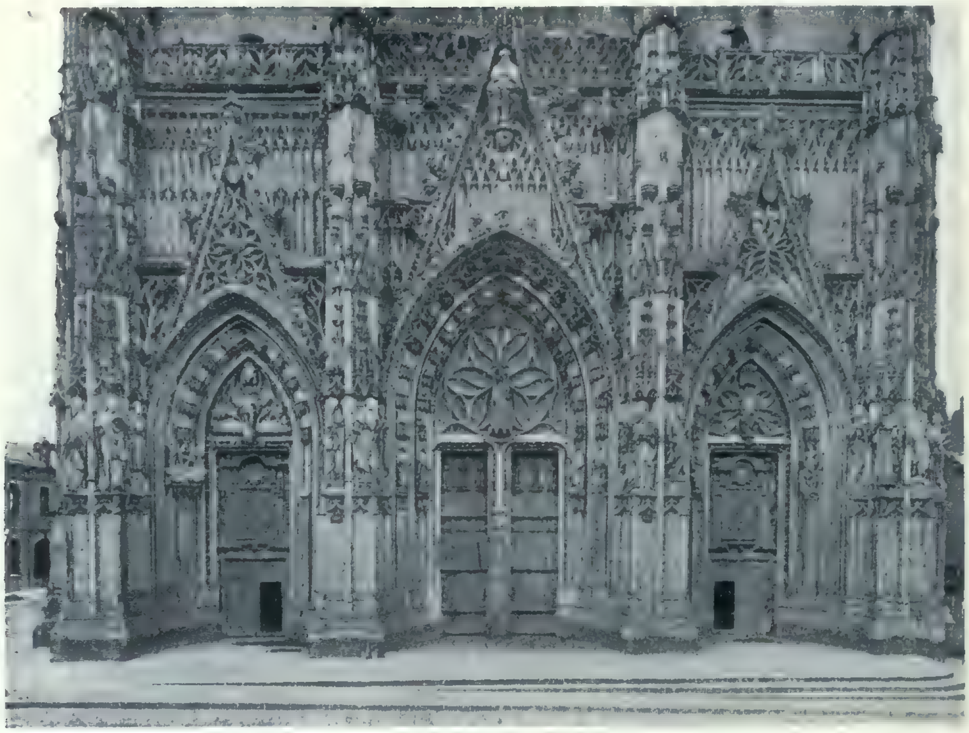
As for the material and spiritual phases of Gothic sculpture work in the thirteenth century the greatest advancement was made in France. Nowhere is this more exemplified than at Amiens. As stated above, the western walls and porches are so covered with sculpture as to be the veritable Biblical teacher of that age. The three porches and adjoining buttresses contain forty life size statues with small figures beneath which identify each one. Directly above is another row extending from side to side of twenty-two full-size beings from regal history. The key to the exterior is found in the figure of Christ placed on the central pillar of the main entrance while the other work evidence His life and death as well as His teachings. Surrounding Him are the Apostles and the Prophets, while the crowned figures above are the kings of Judah. The epitome of the Christian doctrine is depicted in the tympanum representing the Resurrection and Final Judgment.

Rouen, the unrivalled city of gothic art, was founded long before the Roman Era in Gaul. To-day it has its ancient, historic quarters with narrow lanes over which the eaves of the houses practically meet; also its attractive and modern section. Up to 1204 Rouen was under the influence of the Normans, but from that date on it has been under the influence of the French. The city lies on a sloping plain beside the river Seine with steep cliffs near by presenting a grand view of the many spires from which it derives the title of the "City of Churches." The Cathedral of Notre Dame while not so large as those at Amiens and Rheims, rivals them in respect to detail. Arcambeau in his description states that the west facade, erected by LeRoux, 1507, is truly imposing with its pinnacles, open arches, balustrades, three doors of which the two side ones date back to the thirteenth century, great rose window and three hundred statues. The edifice was started in 1202 while the main work was finished in 1223. Ruskin also claims it to be the most exquisite piece of pure Flamboyant work in existence and that there is not a cusp or finial that is useless, not a stroke of the chisel that is in vain; the grace and luxuriance of it all are visible, sensible even to the uninquiring eye; and that all its minuteness does not diminish the majesty, while it increases the mystery of the noble and unbroken vault.

The interior of the Rouen cathedral is full of interest; one feature being the fifteenth century stairway leading to the library, also the five tombs of Duc de Breze and the well known piece by Le Roux of the Cardinal d'Amboise, a Renaissance masterpiece; and ninety-six choir stalls. Considerable glass of the fourteenth century is found with careful workmanship in the details, the broad colored borders enclosing grisville fields enlivened with birds, squirrels and angels playing instruments. The sixteenth century rose window consists of concentric circles of white angels, red seraphim and green foliage contrasting with the reds and yellows of the centre as well as the dark greens and blue on the outer surface.

For beauty and perfection of architecture, St. Ouen, at Rouen, is placed at the head of all collegiate churches in France; while in the proportion of its nave, transepts and choir it even surpasses the excellent example at Cologne. Freeman states that St. Ouen goes farther to unite the two forms of excellence—external outline and internal height—than any other church in France or England. It is the loftiest church

CATHEDRAL AT AMIENS.



DETAIL OF CATHEDRAL AT ABBEVILLE.

in the world that has a real centre tower, a feature of noble outlines and appropriate setting. Upon entering one is struck with the brilliant lighting, to accomplish which a large amount of white glass has been used with the lighter tones of the other colors. Here is found the most complete series of patriarchs, saints, apostles, bishops and abbots all depicted in light shades to bring about the one endeavor to furnish ample light. Other churches containing notable examples of glass work are St. Maclou, St. Vincent, St. Patrice, St. Godard and St. Romain, the last having three rose windows with glass dating from the thirteenth to the sixteenth centuries.

The history of St. Quentin is of great interest and here a strong defence met all invading foes. While unable to defeat the Spanish army in 1557, it enabled the French armies to assemble and save Paris. This defeat, however, was so important that King Philip II erected in commemoration the far-famed palace of the Escorial in Spain. But little of this age is left and the town is modern in every respect. The church on the exterior lacks the graceful gothic feeling of French edifices, but our great pleasure is found within. The two sets of transepts are unusual but charming and extremely so with the stained glass. There are seven double windows in the clerestory with double rows of dignitaries, and rosaces above all with wide borders containing fleur de lis. The great beauty does not depend on the design, but rather on the deep rich color schemes. Philip II robbed the cathedral of all its wonderful tapestries, a reason no doubt for building the Escorial.

Soissons, at one time the capital of Neustria und Clovis, has developed into a quiet provincial city of approximately fifteen thousand inhabitants. The west front of Saint - Jean - des Vignes, dating from the eleventh century, with its beautiful cloister, give us a slight idea of its former splendor. This facade alone was saved from ruthless destruction by the Prussian army in 1814 upon the entreaty of the citizens, although considerably damaged in the war of 1870. The cathedral with its beautiful proportions, carved capitals, splendid glass, is considered one of the most beautiful in France. Rodin, in speaking of the cathedral, likens it to a ship at anchor during the stillness of the night. He sees beauty only in its outlines when the darkness hides the restorations of recent years, and portrays the august character of the original design, just as the sky impresses one of its grandeur in the nightly revel of stars. This gothic edifice, three hundred and twenty-eight feet long and one hundred feet to the top of the vaulting, is quite plain with a tower two hundred and seventeen feet high. The nave is

HOUSE OF FRANCIS I., ABBEVILLE.

pierced by a splendid rose window over two rows of modern glass, in which part of the cathedral is seen the "Adoration of the Shepherds" by Rubens.

Soissons was enriched through the great love for stained glass shown by former patrons. The rose window at the north contains a circle of medallion panels surrounding the central figure of the Virgin Mary, on the outside of which is a double border of panels containing a red field bearing the castles of Castile in gold.

Laon is extremely fascinating, located as it is upon a hill some three hundred and fifty feet out of the plain below. It is the outgrowth of a Gaulish hill fort and mediæval stronghold and has little of its ancient character changed. The cathedral follows the English type of a square termination, but uses the great circular window, above which are three large porches. In addition to the large number of statues and bas reliefs are oxen which guard the upper parts of the towers illustrating a popular tradition which tells that, in order to facilitate the building of the church, an inclined wooden plane was erected from the Place du Bourg to this doorway, and up which the oxen drew the stones and other materials. Each tower encloses a winding staircase visible from the exterior, with small columns of singular lightness and elegance supporting the steps.

It is hard to picture the beauty and wealth of these cathedrals in former days. The following account of what happened to Notre Dame of Laon during the Revolution will furnish in a measure some idea of the sacrifices already made. In 1790, the cathedral was closed for Catholic worship and despoiled of its riches and precious furniture. In 1792 it was used for several weeks as a corn market, and it became successively the temple of the Goddess of Reason in 1793 and of the Supreme Being in 1794. In the great portico all the statues were knocked down and broken, and all the statuettes which adorned the arches were decapitated and mutilated. The cathedral was provisionally given back for religious services in 1795, closed again in 1798, reopened 25th December, 1799; but it was not till April 25th, 1802, that it was definitely and officially restored for Catholic worship. The Episcopal chair, which had been overthrown, was never re-established, and the numerous and powerful chapter were dispersed for ever. The choir was ornamented with rich wood-carving and sculptured screens, upon which were represented the principal events of the exorcising of Nicole de Vervins; but all this wood carving was burnt on the Place du Bourg, during the revolution of 1793.

CHURCH OF SAINT OUEN AT ROUEN.

Rheims, as viewed from the hill which separates the narrow vale of Epernay from the great plain of Rheims, presents a magnificent view. The city was razed by Attila in 508 and made an archbishop's see in 744, from which date it became the ecclesiastical capital of France. The cathedral, which has been somewhat damaged by the various recent bombardments of the German and French armies, is referred to by Viollet-le-Duc as the queen of Gothic cathedrals. Here the kings of France were consecrated in

CATHEDRAL AT ROUEN.

memory of the baptism of Frank Clovis by Saint Remy. Started in 1211, its tower was completed about 1430, shortly after which a conflagration destroyed the upper portions and the only part to be restored was the sanctus-belfry on the summit of the apse. As suggested, the edifice is a superb expression of the earlier inventions of the builders of Aquitaine and Anjou combined with those of the architects of the Ile de France. The part which impresses us most is the magnificent grouping of the west front and the perfect appropriateness of its studied ornamentation applied with no less sobriety than judiciousness. The facade with its twin towers two hundred and sixty-three feet high presents a creation of life and interest, having a triple doorway five hundred and thirty statues, a rose window forty feet in diameter, a gallery of kings and other decorative features.

The general arrangement of the plan; harmony of the parts; absence of side chapels; proportion of side aisles to central nave—all go to place the cathedral at Rheims as one of the best if not the most perfect in France. Its measurements within are four hundred and fifty-three feet long, ninety-nine feet broad, and one hundred and twenty-five feet high.

As nearly all the kings of France were crowned in the cathedral, and in honor of such royal consecration, the great clerestory possesses a series of windows containing the first thirty-six kings of France, together with the archbishops who consecrated them. Brown glass has been used for flesh tints, since a lighter shade would have clashed with the other rich and strong colors and spoilt the existing harmony of tones. Of the three rose windows the western one with the kings below is the best, exemplifying the deep richness of early glass. An interesting feature occurs in the transept. A series of bishops, one to a window, are shown with a fanciful representation of his cathedral. Care has been taken to make each building different, revealing an artist with a fertile imagination. St. Remi is also rich in glass depicting the French kings, and while the work is of an earlier date the colors do not have the same depth and richness as those found in the cathedral.

While probably not triumphal, the great arch at Rheims partakes of the nature of the triumphal arches by its beauty of proportion and dignified splendor. This arch was doubtless, when perfect, more magnificent than any of the arches in Rome. Its great size no doubt lends much to its impressiveness. It is composed of three archways, the central one of which is slightly wider than those on the sides. While, unfortunately, this arch has been so much injured by being built into the walls of the city that it is difficult to say what its original form may have been, there still remains in excellent condition enough to make its beauty beyond question. The column, for instance, on the extreme right, and the bit of architrave above it, are remarkably well preserved and full of fine expression. The columns are Corinthian, and are more delicate than

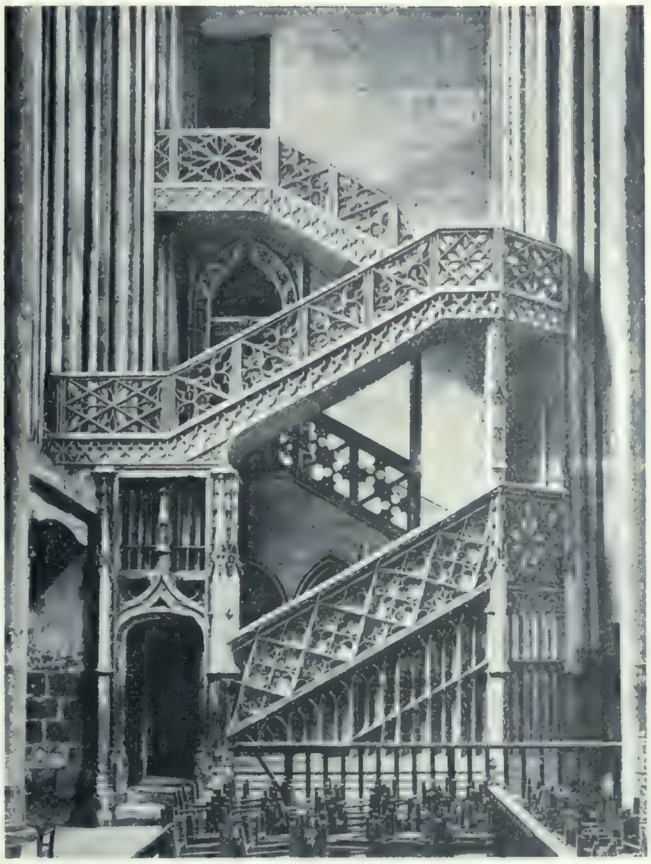
CATHEDRAL AT LAON.

most work of their time; for that time, if we may judge from the decadent style of the sculpture, was in the last age of the Roman empire.

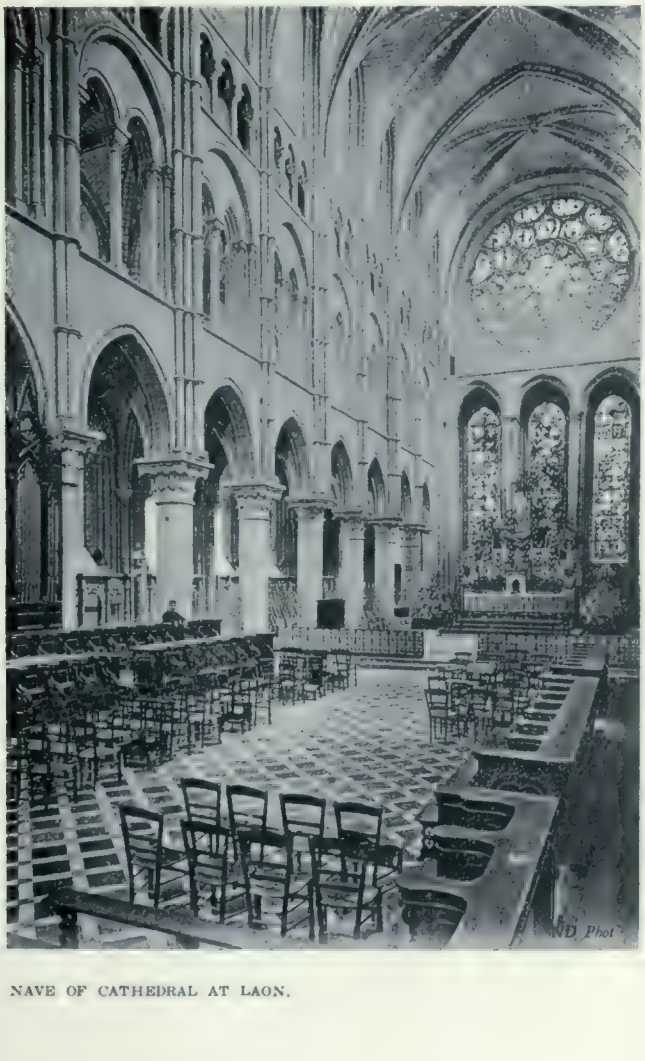
The following discussion of Flamboyant Gothic churches appeared in *The Brochure* and furnishes an idea of the rapid and sane growth of this style in architecture: The history of the Gothic style of architecture in France follows the course of almost all the styles that the world has seen,—a course so common that it has almost come to be formulated into a law of art. Beginning rudely, but with abundant energy, the style gradually progressed in refinement until it touched its period of highest development. Thereafter, the skill of hand remaining but the original impetus and inspiration sapped, it declined. It is the Gothic of this third period, the period of decline, which, in France, has been called "Flamboyant" from the flame-like curves most characteristic of its tracery, that we have here to consider.

"The art of any epoch is determined by an aggregation, which is the general state of mind induced by surrounding circumstances;" and to fairly understand any style it is necessary to glance, even though cursorily, at the history of its period.

Gothic architecture in France reached its greatest general perfection in the thirteenth century; but the beginning of the fourteenth inaugurated a long period of artistic stagnation, for, with the accession of Phillipe de Valois in 1328, commenced that sanguinary and protracted struggle between the rival thrones of France and England which continued, with little interruption, to the year 1450. During this period history presents but an unvarying recital of provinces laid waste, towns ruined and their monuments given up to the flames. The soil of France, traversed in turn by the hostile armies of the stranger and by the equally ferocious mercenaries charged with her defence, ravaged by pest and desolated by famine, offered a field little favorable to the development of architecture,—an art which, above all others, needs the fostering of peace. As was natural during such a period, the over-charged emotional nature of the nation found its vent in an unparalleled and feverish outburst of religious ardor. "When," says Taine, "men are very miserable they become excitable, like invalids and prisoners. Their sensibility increases and acquires a feminine delicacy; their heart is filled with caprices, agitations and despondency,—excesses from which they are free in a healthy state. They depart from such moderate sentiments as alone can maintain continuous masculine action. One can easily appreciate the hold the Christian faith derived from such sentiments. Morbid or trembling sensibility found its support in infinitudes of terror and of hope, in imaginings of flaming pits and of eternal perdition, and in



STAIRWAY TO LIBRARY, ROUEN CATHEDRAL.



NAVE OF CATHEDRAL AT LAON.

conceptions of a radiant paradise and of ineffable bliss."

It was not until about the middle of the fifteenth century, after more than one hundred years of desolation, that, inspired by the appearance of that idyllic figure, Joan of Arc, France roused herself from the desperate and weakening lethargy. Foot by foot the English were driven back, until Calais alone remained in their possession, and she resumed her place among the nations. Once again the arts flourished, and churches began to be built on all sides; but now in a new style, a style which showed no uncertain traces of the feverish moral excitement of the intervening century. The earliest authentical examples of Flamboyant Gothic correspond pretty nearly in date with the expulsion of the English.

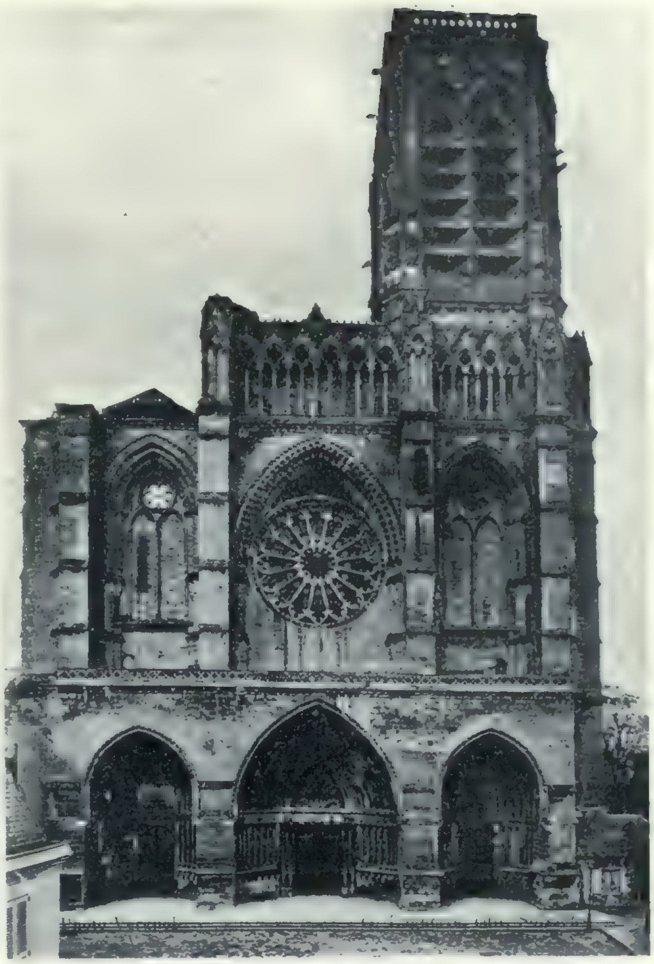
INTERIOR OF CATHEDRAL AT SAISSONS.

But with this new upspringing, and relief from misery, came a natural reaction from the delirious religious ardor of the foregoing period. Never, truly, had the Church demanded more stringent outward observances or more exacting service; but the inward faith, overstrained, had relaxed and weakened. The clergy found it necessary to forward the work on their churches by selling indulgences. At Rouen the abbot of St. Ouen was obliged, in spite of his vast domains, to twice have recourse to this means, and published two decrees, the first granting forty, and the second one hundred days of absolution—for cash payment. The south tower of the facade of Rouen Cathedral was constructed from the funds raised by the sale of permissions to eat butter during Lent, and has been known as the "Tour du Beurre" ever since. The zeal of the workmen, which in the preceding centuries had sprung solely from religious ardor, now became coupled with another sentiment,—the desire for personal recognition as artists; and if they still worked for God's glory they had now no small thought for their own glory and reputations; and from the Flamboyant period on, they have taken care to leave us in no such ignorance of authorship as in the preceding centuries.

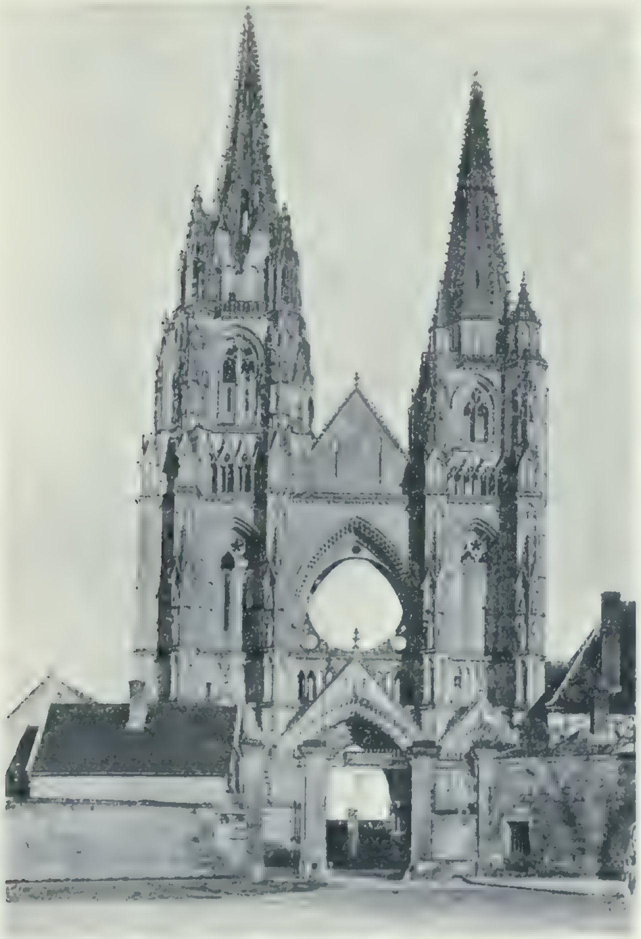
"You have," writes Ruskin, "in the earlier Gothic, less wonderful construction, less careful masonry, far less expression of harmony of parts in the balance of the building. Earlier work always has more or less of the character of a good, solid wall with irregular holes in it, well carved wherever there is room. The last phase of good Gothic has no room to spare; it rises as high as it can on the narrowest foundation; stands in perfect strength with the least possible substance in its bars; connects niche with niche, and line with line, in an exquisite harmony, from which no stone can be removed, and to which you can add not a pinnacle; and yet introduces in rich, though now more calculated profusion, the living element of its sculpture: sculpture in the quatrefoils—sculpture in the brackets—sculpture in the gargoyles—sculpture in the niches—sculpture in the ridges and hollows of its mouldings,—not a shadow without meaning, not a light without life.

"But with this very perfection of his work came the unhappy pride of the builder in what he had done. As long as he had been merely raising clumsy walls and carving them like a child, in waywardness of fancy, his delight was in the things he thought of as he carved; but when he had once reached this pitch of constructive science, he began to think only how cleverly he could put the stones together. The question was not now with him, What can I represent? but, How high can I build—how wonderfully can I hang this arch in air, or weave this tracery across the clouds? And the catastrophe was instant and irrecoverable. Architecture became in France a mere web of waving lines,—in England a mere grating of perpendicular ones. Redundance was substituted for invention, and geometry for passion; the Gothic art became a mere expression of wanton expenditure and vulgar mathematics."

It must not be supposed, however, that this degradation of French Gothic from its highest perfection was instant and universal; and although the change, because of the long preceding period of almost complete stagnation, is more marked than is usual in such transitions, where the dying style dissolves and fades by barely perceptible gradations into that which is to succeed it, the early Flamboyant work fell but little short of the best of that of the thirteenth century. "Flamboyant tracery," says Freeman, "certainly does produce forms of the most extreme ugliness; but, on the other hand, when really well wrought, perhaps no other is so thoroughly satisfactory. '*Corruptio optimi est pessima.*' No other style has the capabilities of Flamboyant; no other has so grievously abused them. It has, on the one hand, reared the very noblest temple of our faith; on the other, it has run into all the perverse extravagances of an exuberant and undisciplined fancy. Truly the Abbey of St. Ouen may claim the first place among all the edifices that human skill has ever reared. Without, it combines the vast height so conspicuous in French churches with the more majestic outline of the English; the cross form nobly developed, no dimensions stunted, and all circling round, what Amiens, and Cologne, and Freyburg cannot boast, the true predominant central tower, and that one mass of superb tracery, and crowned with the lovely lantern."



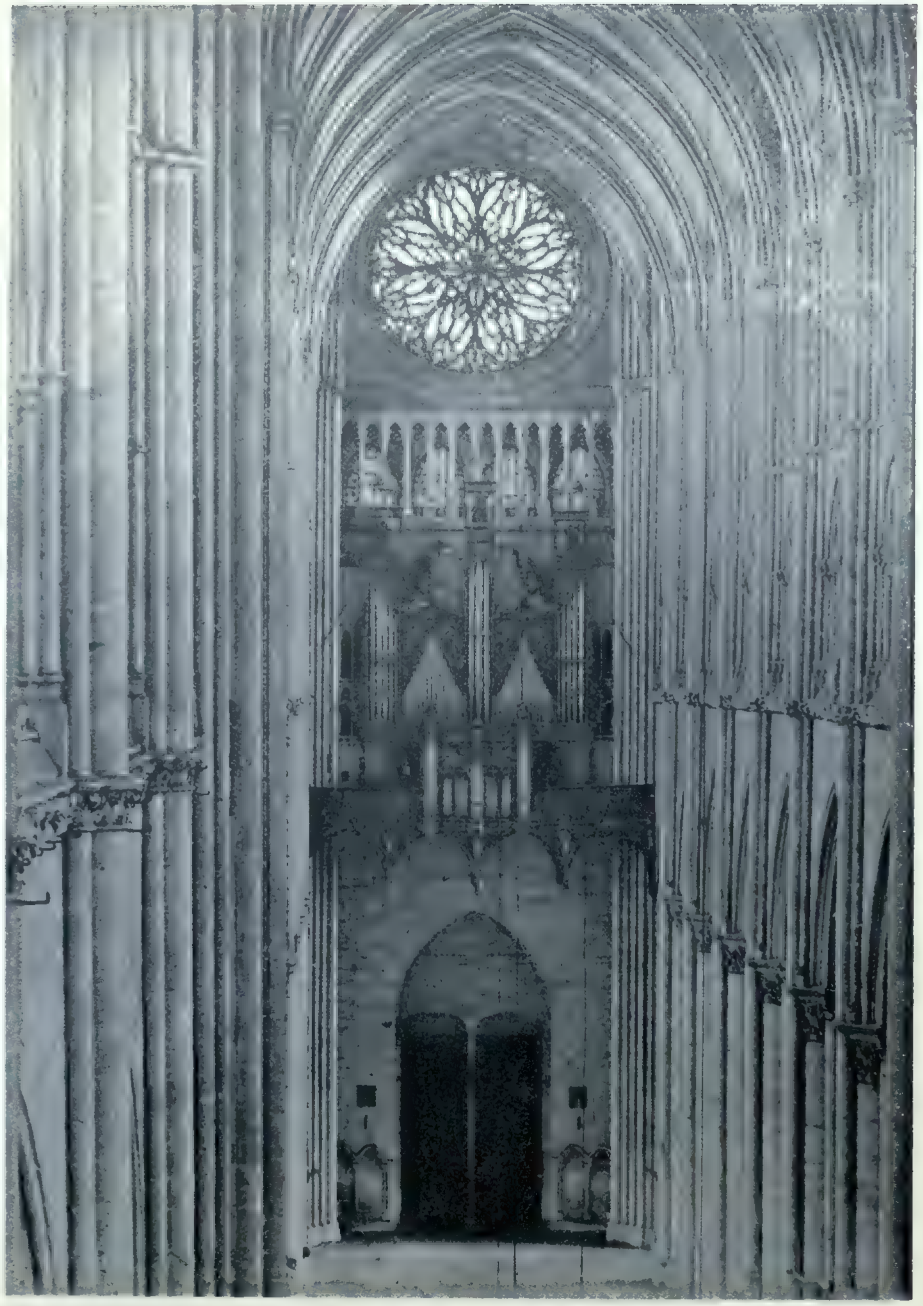
CATHEDRAL AT SOISSONS.



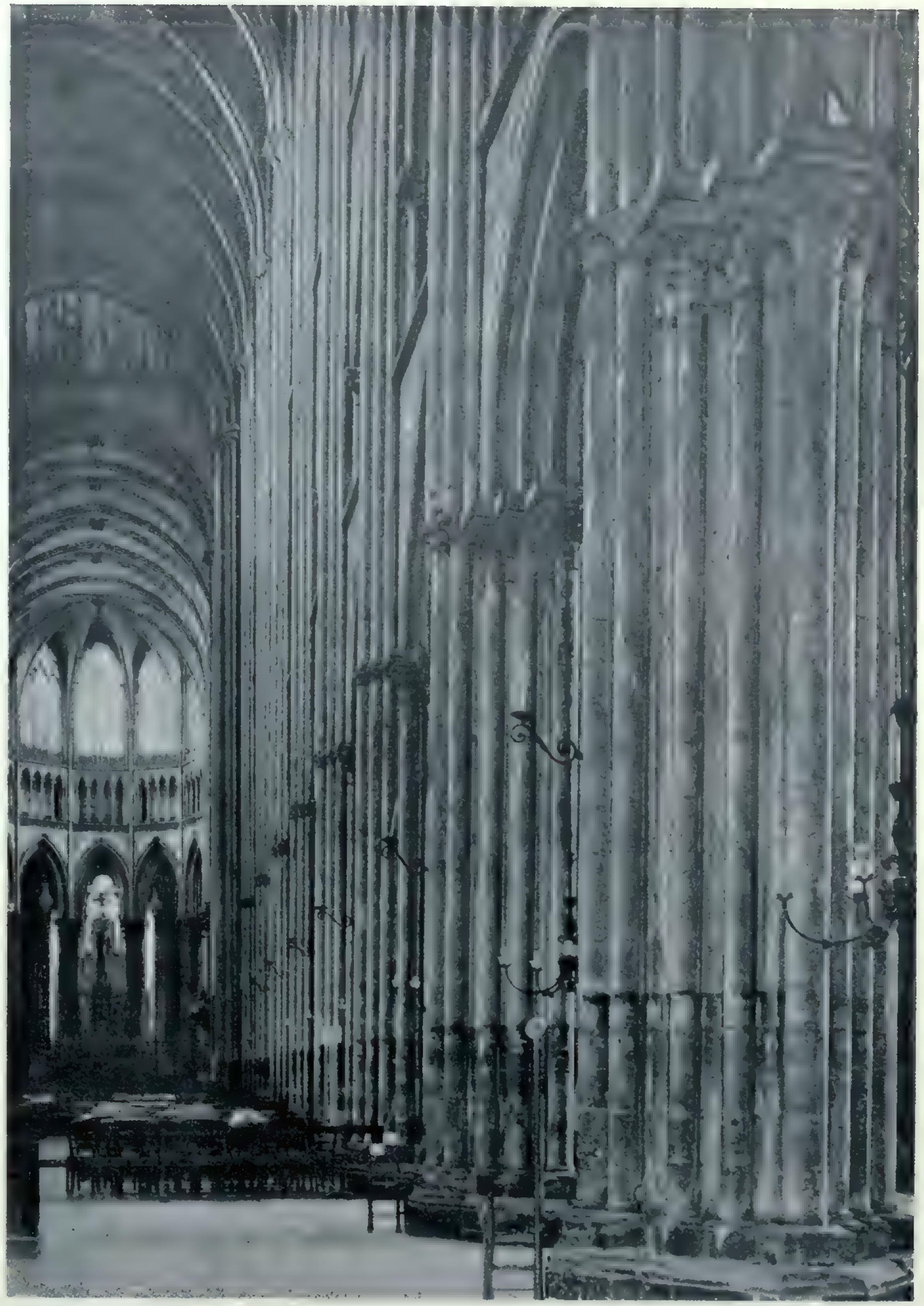
SAINT JEAN DES VIGNES AT SOISSON.

Perhaps the most lucid exposition of the essential characteristics of the Flamboyant style, and certainly a most readable one, has been given us by Ruskin in his "Seven Lamps of Architecture." Taking as a text the window, as a typical feature of the Gothic style, he traces it through the earlier stages of its development, and then continues:—

"We have seen the mode in which the openings or penetrations of the window expanded,



AMIENS CATHEDRAL. NORTH AISLE.



THE NAVE. ROUEN CATHEDRAL.

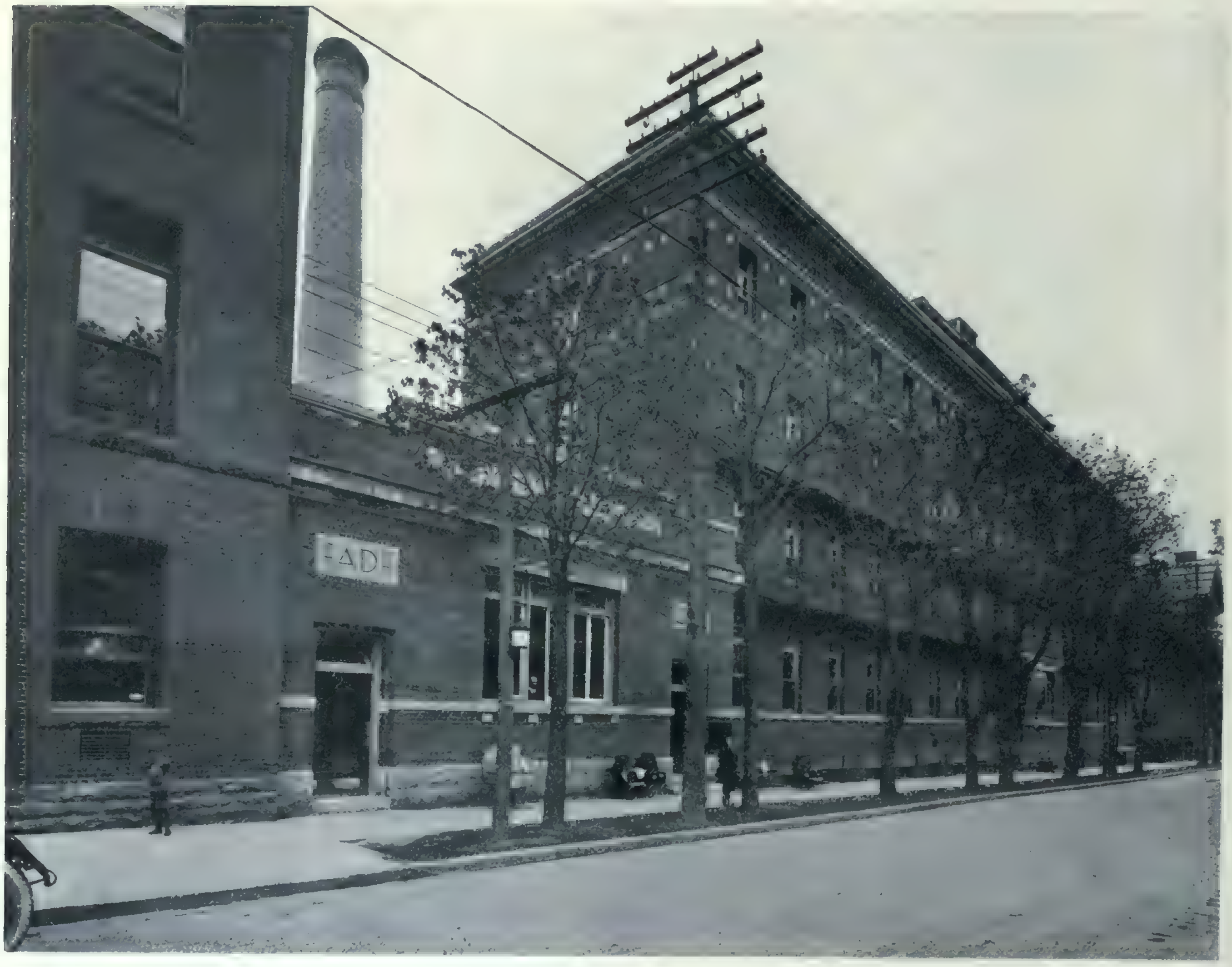
until what were, at first, awkward forms of intermediate stone, became delicate lines of tracery; and I have been careful in pointing out the peculiar attention bestowed on the proportion and decorations of the window at Rouen as compared with earlier mouldings, because that beauty and care are singularly significant. They mark that the traceries had *caught the eye* of the architect. Up to that time, up to the very last instant in which the reduction and thinning of the intervening stone was consummated, his eye had been on the openings only, on the stars of light. He did not care about the stone; a rude border of moulding was all he needed; it was the penetrating shape which he was watching. But when that shape had received its last possible expansion, and when the stone-work became an arrangement of graceful and parallel lines, that arrangement, like some form in a picture, unseen and accidentally developed, struck suddenly, inevitably, on the sight. It had literally not been seen before. It flashed out in an instant as an independent form. It became a feature of the work. The architect took it under his care, thought it over, and distributed its members as we see. I have confined myself, in following this change, to the window, as the feature in which it is clearest. But the transition is the same in every member of the architecture.

CHOIR OF ST. LOUP AT CHALONS.

"Now, the great pause was at the moment when the space and the dividing stonework were both equally considered. It did not last fifty years. The forms of tracery were seized with childish delight in the novel source of beauty, and the intervening space was cast aside, as an element of decoration, forever. . . . That tracery marks a pause between the laying aside of one great ruling principle and the taking up of another; a pause as marked, as clear, as conspicuous to the distant view of after times, as to the distant glance of the traveller is the culminating ridge of the mountain chain over which he has passed. It was the great watershed of Gothic art. Before it, all had been ascent; after it, all was decline; both, indeed, by winding paths and varied slopes; both interrupted, like the gradual rise and fall of the passes of the Alps, by great mountain outliers, isolated or branching from the central chain, and by retrograde or parallel directions of the valleys of access. But the track of the human mind is traceable up to that glorious ridge, in a continuous line, and thence downwards. And at that point and that instant, reaching the place that was nearest heaven, the builders looked back, for the last time, to the way by which they had come and the scenes through which their early course had passed. They turned away from them and their morning light, and descended towards a new horizon, for a time in the warmth of western sun, but plunging with every forward step into more cold and melancholy shade.

"At the close of the period of pause, the first sign of serious change was like a low breeze passing through the emaciated tracery, and making it tremble. It began to undulate like the threads of a cobweb lifted by the wind. It lost its essence as a structure of stone. Reduced to the slenderness of threads, it began to be considered as possessing also their flexibility. The architect was pleased with this his new fancy."

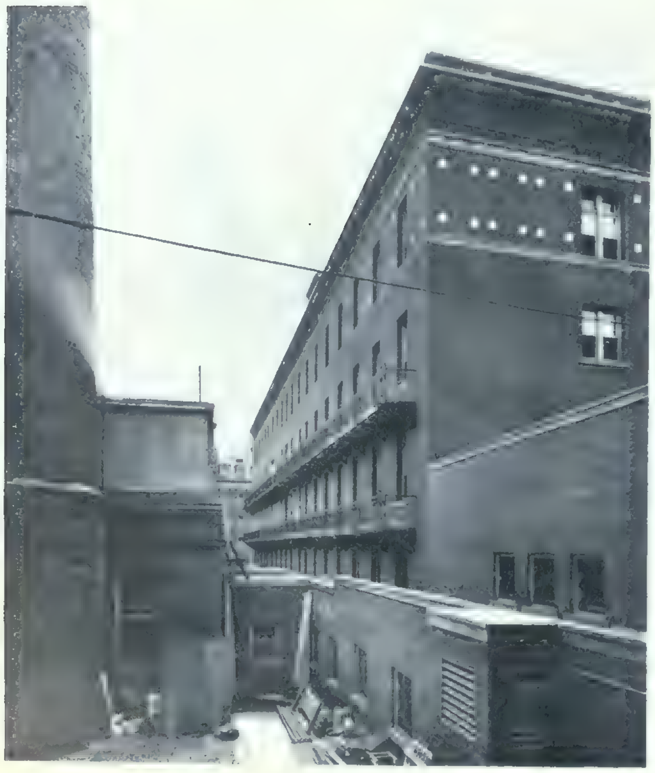
ROMAN ARCH AT RHEIMS, FRANCE.



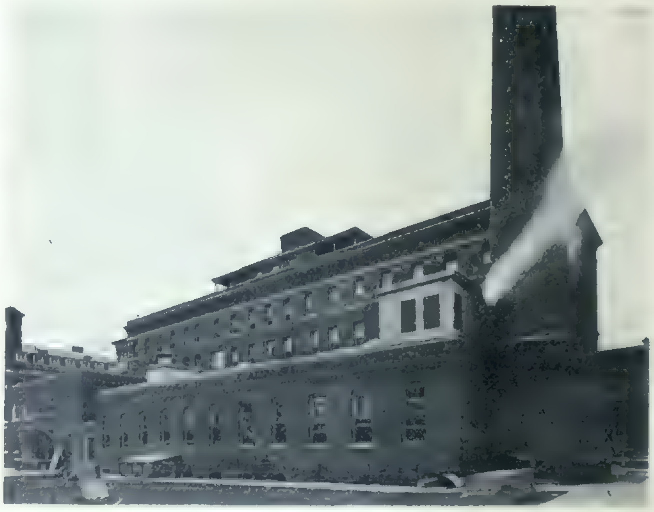
NEW WEST WING OF OUT-PATIENTS' DEPARTMENT
ON ELIZABETH STREET.

HOSPITAL FOR SICK CHILDREN, TORONTO.

STEPHENS & LEE, ARCHITECTS.



VIEW BETWEEN LAUNDRY AND WEST WING.



LAUNDRY AND POWER HOUSE.

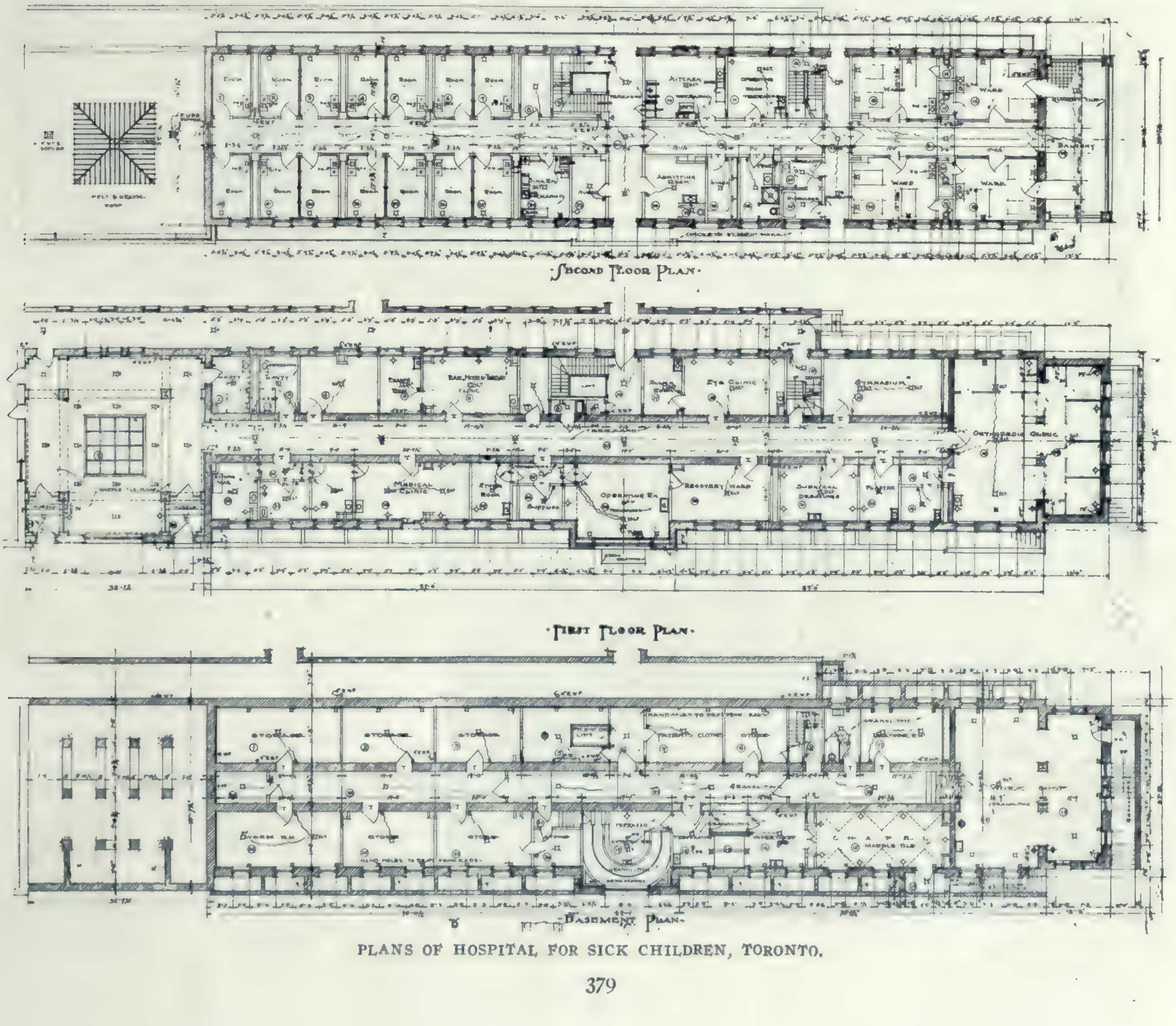
Hospital for Sick Children, Toronto

THE alterations and the additions to the Hospital for Sick Children, College and Elizabeth streets, Toronto, are now complete. These consist of a new wing, including new out patients' department, a power plant and laundry, and a new pasteurizing building and plant. In addition to this there have been various alterations and changes to the main building, described shortly as follows: The whole of the top floor has been given up for an operating suite, with two large operating rooms well lighted from the north. Immediately adjoining these is the sterilizing room, anaesthetic rooms, work rooms for preparation of dressings and accommodation for surgeons and dental operating room.

A new electric elevator has been installed. Each of the five large wards flanking the building on the east and west have been altered and extended in such a manner as to permit the addition of an airing balcony at the southeast of each and a sink room, bathroom and toilet at the north end of each. The kitchen has been extended and much improved by the addition of cold storage, new diet kitchen and complete modern equipment throughout.

It has been found necessary to enlarge the X ray department for the treatment of special cases. The space that was formerly occupied by operating rooms has been assigned for this purpose, and an apparatus has been installed with dark room, etc. These changes, with the adjustment to heating arrangements and the installation of modern ventilating system and electric lighting, have brought the main building completely up to date and the last word in modern hospital construction.

On the west side of the property has been built a new wing, the ground floor of which is divided up into the various clinics for out patients' treatment, with a waiting room capable of seating 200 patients, and dispensary. This department includes operating suite, orthopedic and surgical clinic; ear, nose and throat clinic; eye clinic, medical clinic, dressings, examination, preparation and plaster rooms. In connection



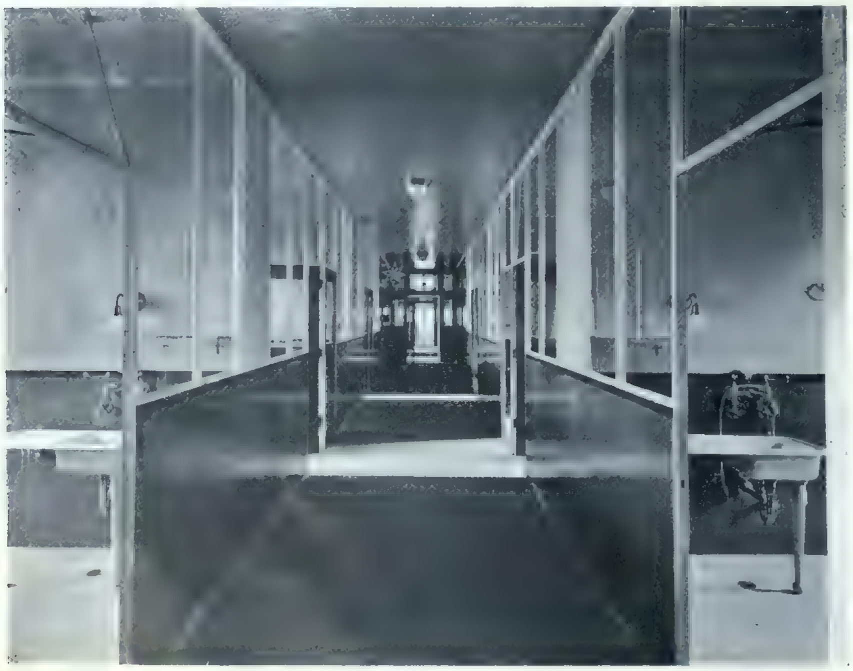
PLANS OF HOSPITAL FOR SICK CHILDREN, TORONTO.

OUT-PATIENTS' WAITING ROOM.

with the orthopedic clinic is a large workshop with modern machinery driven by electric motors for manufacturing the various artificial appliances prescribed for patients in this department. The second and third floors of this wing are divided into 14 single and four 3-bed wards on each floor, making extra accommodation for 52 patients. These will be used for detention purposes to prevent the admission or spread of communicable diseases in the hospital. Each of these floors has its own diet kitchen, sink room, receiving and discharge rooms. The division between the wards themselves and corridors are made by means of metal and glass screens running from floor to ceiling for the purpose of keeping the patients under complete observation. These various floors are accessible by elevator or staircase, the elevator cage being constructed to take a bed if necessary. This elevator runs to roof, which is to be used as an open-air ward, having been covered with flat red tile, and protected by high parapet wall, with that end in view. There is provision also on this floor for kitchen, toilets and sink rooms, so that patients may be treated on the roof as long as is thought desirable. On both sides of ward floors and outside of building running from end to end are observation balconies, and at the south end of each floor are airing balconies. The top floor is at present given up to accommodate the servants, and is so arranged as to be converted into wards when necessary. The basement is taken up by orthopedic workshop, autopsy room, morgue, chapel and various storerooms. The construction throughout is fireproof, the floor construction being concrete and expanded metal, all beams and columns being fireproofed with concrete, and wood trim being reduced to a minimum, only being used for doors and windows.

The hospital has followed the lead of many other institutions who find economy in providing their own light, heat and power, and for this purpose a building has been erected in a central position on the property. The basement of this building is occupied by the boiler room, containing three 200 h.p. water tube boilers, and a generating room, containing electric generators and ice manufacturing machinery. From this plant is derived the steam to heat the various buildings, being conveyed in mains run through tunnels constructed for them. From the generators is derived the electrical power necessary for lights and to drive the motors in use for fans, laundry, workshops and ice machine. The refrigeration is run in cork-covered piping to the Pasteurizing plant, ice-making room and cold storage boxes in the main building, and other parts of the hospital.

To provide the requisite draught for boilers, a stack has been erected to the north of the power-house at a height of 125 feet from the ground level, and high enough to



CORRIDOR, FIRST FLOOR, NEW WING.

remove fumes of coal consumption clear of adjoining buildings. Coal bunkers, with a storage capacity of 200 tons, have been built adjoining the power-house to the north. The fire boxes to boiler are fed automatically, each grate having its own smoke-consuming apparatus.

On the upper or ground floor of the power-house is situated the laundry. This is a room 80 ft. long by 30 ft. wide, and is fully equipped with all the most modern laundry machinery, including washing machines, body ironers, rotary extractors, mangle and drying cabinet. In connection with this are the sorting rooms. The machinery throughout is run on panel board control, the power for which is derived from the power plant as described. Like the other new buildings, the power plant and laundry have been constructed of materials thoroughly fireproof and of strong and lasting qualities.

For the dairy and Pasteurizing plant, which formerly occupied temporary quarters in a cottage on Laplante avenue, a new building has been erected at the rear of the power plant and facing the nurses' home. In accordance with the growing demand for certified and Pasteurized milk, a modern equipment has been installed, including bottle-washing machine, bottle fillers, separator, Pasteurizers, steam kettles, ice boxes, etc. Serviceable quarters have been assigned for distribution to the public, who have access through Laplante avenue. All buildings are intercommunicating by means of covered corridors, which give access to each department.

The architects of this work were Stephens & Lee; engineers, Williams & Cole; building superintendent, R. H. Collinge.

ORTHOPEDIC CLINIC, OUT-PATIENTS' DEPARTMENT.

NEW OPERATING ROOM IN MAIN BUILDING.

FOR several reasons a children's hospital should not be directly connected with a hospital for adults. The isolation of the patients in a children's hospital must be more complete, and is a necessity on account of the communicable nature of children's diseases from one to another and on account of their peculiar liability to secondary infections. Their resistance to such infections is lowered by wasting disease. Perfect isolation is easily obtainable in a large institution built on the cottage plan, and can also be maintained in a pavilion plan, but it is more difficult to accomplish this in a small hospital in which all of the patients must be housed in one building. This is likewise the case in the usual city hospital built on the block plan. Small hospitals and city hospitals should be designed and equipped so that they can be divided into separate units by closing doors which are normally concealed in recesses across corridors and by sealing the joints. Many of the rooms should have French windows opening to exterior porches, so that the isolated portions of the building can be served by way of stairs open to the air. The institution must be divided up into as many well-separated units as possible, to provide for partial isolation of different classes of diseases. Surgical (clean and pus), medical, skin, gastro-intestinal diseases, and the specialties, eye, ear, nose, and throat, etc. There must be ample provision for the isolation of patients in small wards and single rooms. The unit measurements of the architectural features should also differ in a hospital for children from those for adults, and it is a mistake to attempt to maintain the same unit measurements of floor, window and air space. Inasmuch as the childrens' beds are the smaller, the window spacing should be in proportion, the window-sills ought to be lower, and the stories need not be as high, for their breathing capacity does not require as much initial air space. The stairs should have a lower rise, and other details require special treatment.—*Hornsby and Schmidt.*

Copper Alloy as a Retardant in Metal Lath of Corrosion

CLARENCE W. NOBLE

THE problem of corrosion in metal lath is one which is receiving far greater attention today than it did ten years ago. At that time the metal lath industry was in its infancy and corrosion had not yet had time to manifest itself. Its dangers were not therefore appreciated. Architects specified metal lath indiscriminately without stating whether or not the material was to be protected. Contractors, being but human, put no more value into their work than was demanded. As a result, many a job has been erected with metal lath which is in no way protected from the rusting effect of the plaster. The recent discovery that the lath in some of these buildings has practically disappeared, has brought about a greater care in such specifications.

It is a well known fact that metal lath bedded in hard wall plaster is corroded far more rapidly than were it exposed to the atmosphere. The reason for this is not generally understood.

The basis of all hardwall plasters is plaster of paris or calcium sulphate. This is a salt which may be described as having sulphuric acid as one of its ancestors. The bad family name has clung to the child, and the corrosion of metal lath in hard wall plaster is regarded by many as the result of an acid attack. This, however, is not the case. Calcium sulphate is not acid in its nature. The test with litmus paper gives a blue color which indicates alkali. This is further shown by the fact that many hard wall plasters contain hydrated lime. Every school boy knows that if lime and sulphuric acid are placed in contact, the result is a rapid evolution of hydrogen gas, together with the destruction of both the acid and the lime. The presence of an acid in a plaster containing lime is therefore impossible.

In order to explain the reason for the corrosion of metal lath in hard wall plaster it is first necessary to consider the nature of rust. Electric action and chemical action are very closely related. It is now generally admitted that corrosion in steel is the result of electrical action. The elements necessary to form an electric battery exist when two metals differing in electric potential are in contact in the pres-

TO THE LEFT, WEIGHING THE SPECIMENS.
ABOVE, TEST SPECIMENS BEDDED IN PLASTER.
BELOW, SPECIMENS READY FOR TESTING.

ence of an acid or salt. The ordinary lack of uniformity in the distribution of the chemical impurities in steel is sufficient to vary the electric potential of the metal and consequently to make one of the necessary conditions for a weak electric current. The other condition is afforded by the small amounts of impurities that are found in nearly all water or moist air. This weak electric current in time results in the corrosion of the steel.

Hardwall plaster in setting up is electro-active. When it hardens in contact with unprotected steel, it forces an electric current through the steel and consequently greatly accelerates rusting which, without the assistance of the forced current, would be weak or absent. This explains the real reason for the corrosive properties of hard wall plaster.

The writer is the general sales agent for a recognized brand of metal lath. More than any other Canadian therefore, the problem of corrosion in metal lath is his problem. The investigation of the properties of copper alloy in hard wall plaster described in this paper by him was made in the course of a general study of the properties of several advertised brands of rust resisting steel. It was necessary first to decide what would be a fair test. Technical information on this point is woefully lacking. There is an abundance of opinion recorded, but very few tests. The only extensive tests of the effect of hardwall plaster on metal known to the writer, outside of his own, are those being conducted by the Bureau of Standards of the United States Government. Dr. Pearson, who is conducting these tests, believes that the proof of the pudding is in the eating. He, therefore, has erected a large number of panels each about 18 x 24 inches square, using samples of practically all the metal lath on the American market together with all the different types of protecting coating, and covering them variously with all kinds of plaster he could find. These test panels were erected some two years ago. It was proposed to await their destruction by time, after which an adequate report could be written. The main objection to this system is that time may not destroy the panels. The writer recently made a careful examination of them. Nearly all, particularly those on coated lath are apparently in excellent condition. In some cases the portion of the lath which was not covered by the plaster shows rust. There is no means short of the destruction of the panel of finding out whether or not the portion of the lath which is bedded in the plaster is rusting.

As has been stated, it is the opinion of Dr. Pearson that corrosion tests must be carried to destruction. His reason for this lies in the lack of uniformity of individual results. With this opinion the writer must differ. Time may be of no value to the United States Government, but the architect in private practice wants information about the quality of his materials not for his grandson, but for himself. Lack of uniformity must be overcome by averaging the results of a large number of tests. Dr. Pearson's tests are, when analyzed, a combination of a weather exposure test, and hard wall plaster exposure test. That portion of the lath which is not bedded in the plaster receives a weather test, and the balance of it is tested by the plaster. Full information now exists as to the destruction of steel by weather. Only information on destruction by plaster is needed. It is this information which the writer has secured.

As plaster of paris is the cause of the mischief, it appeared reasonable to make a series of tests with this material. The Canadian Laboratories Ltd., of Toronto, were employed to do the work. They were supplied with a number of samples each one inch square of twenty-seven gauge steel both of commercial metal and copper alloy. These were carefully cleaned in sulphuric acid of all mill scale after which they were washed in a bath of lime water followed by pure water. They were then dried and accurately weighed. After weighing they were bedded in plaster of paris, where they were left for a time varying from seven to ninety days. When this time had expired they were removed, cleaned of plaster and washed in ammonium citrate. This removes the rust without attacking the steel. After the removal of the rust the specimen was again weighed, and by subtraction from the original weight, the loss of weight by corrosion was found. This, when divided by the original weight gives the per cent loss of weight, which is the figure desired for comparison. No extreme accuracy was attempted in securing specimens of identical area as the reduction of all losses to percentage of original weight gives results which are comparable regardless of the area used in their determination.

The net gain from this first series of experiments was only experience. Pure plaster of paris sets very rapidly. Enough plaster was mixed to bed the entire series of twenty-four specimens at one time. When bedding was first started, the plaster was very wet, but before it was finished it had set up sufficiently to make it necessary to exert considerable pressure in order to cause it to adhere well around the specimen. It was found that the specimens bedded in fresh mortar had corroded rapidly while others had not. The result was that the ninety day tests showed less corrosion than those of fourteen days, a result which was necessarily somewhat disconcerting. Owing, however, to the fact that specimens which were to be removed at the same time were bedded in consecutive order, and consequently were subject to attack from plaster in a similar condition, it was found that comparison could reasonably be made between the different specimens in the same set. Such comparison indicated a resistance of corrosion on the part of copper alloy greater than that of the other materials tested. It is the hope of securing more accurate information along this line that led to the second series of tests.

The general procedure of the first series of tests was followed in making a second series except that several modifications were made in order to secure more accurate results. The idea of accelerating the tests by using pure plaster of paris was abandoned. Instead, five different series of tests were made, using five brands of commercial plaster. In order to avoid the error arising from difference in the amount of absorbed water, only sufficient plaster was mixed to imbed one specimen at a time. The water used was always forty per cent. by weight of the plaster and the specimens were placed in the plaster immediately after the admixture of the water. It was suggested by others who contemplated a similar series of tests that the rate of corrision might vary with the humidity of the atmosphere. Consequently an atmosphere of standard humidity would be necessary in order to permit comparison with tests made by different observers. In order to secure this, the specimens were stored over a water bath in a closed box, thus insuring complete saturation of the atmosphere. The possibility of electrolytic action between the specimens was avoided by keeping them separately stored on glass plates.

Each of the five different series of tests consisted of fifteen specimens of plain steel and fifteen of copper alloy intended for removal three of a kind at a time, at one day, seven days, fourteen days, thirty days and ninety days. Thus a total of one hundred and fifty specimens were tested.

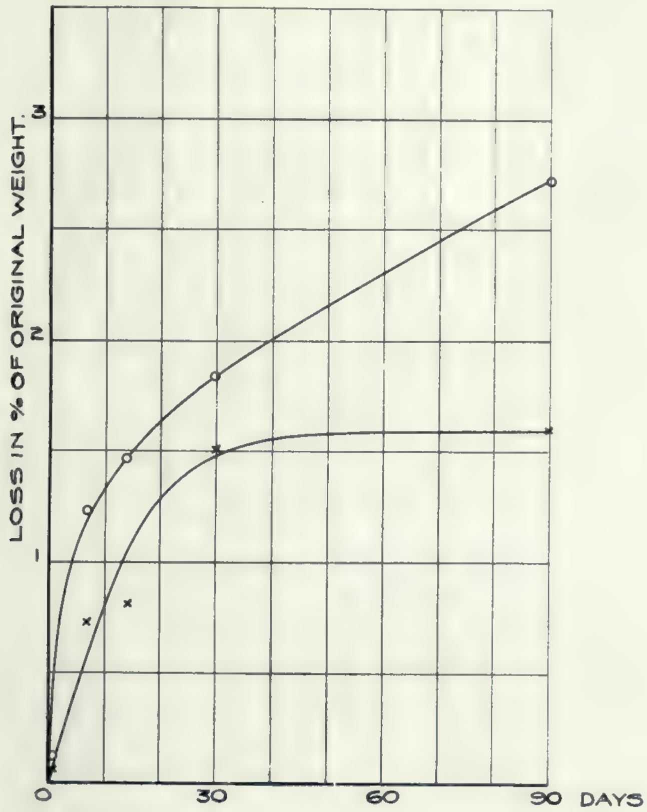
The plasters selected for tests are among the most widely known brands on the Canadian market. With the exception of the plaster indicated in the table as Number 1, they are typical hard wall plasters. Number one is a slow setting patented plaster having but a small percentage of calcium sulphate in its composition, and is more porous in its nature than the others. The plasters used were furnished by their manufacturers who knew the purpose for which they were to be used. With them they gave a statement of their composition. Plasters No. 2, 4 and 5 contain about 70 per cent. sand; No. 3 contains no sand. It is furnished to the plasterer in this condition with the understanding that he will add his own sand. All plasters were tested just as furnished. The other constituents of the hard wall plaster are plaster of paris, a small amount of hair, a little retardant and a varying amount of hydrated lime.

Both the ordinary steel and the copper alloy were manufactured by the U. S. Steel Corporation. The plain steel was obtained from commercial stock while the copper alloy was from sheets furnished for the test. Through a misunderstanding the gauges of the specimens were not uniform. The plain steel tested with plasters except No. 2 was 25 gauge, while the copper alloy was 26 gauge throughout. Twenty-seven gauge plain steel was used with No. 2 plaster. On this account the comparison of results by percentages of original weight lost would give misleading results. This difficulty was overcome by correcting the reported results by a factor which in effect reduced the percent of loss to that on an equivalent area of 27 gauge metal.

The mass of information obtained with each kind of plaster at each time of exposure is considerable, but can be summarized in two figures stating the average percentage of loss of the three specimens of each kind of steel tested. These figures from all tests corrected to bring them to standard basis of 27 gauge steel are given at the end of this article.

The rate of corrosion of steel under apparently like conditions varies so widely that uniform results cannot be expected from specimens one inch square even in the average of three tests. The value of the individual figures in the above table lies therefore chiefly in the fact that they are constituent figures in larger averages based on all the plasters tested for a given time, or all of the times tested for a given plaster. The figures showing the average effect of time regardless of plaster are shown in the columns at the right hand of the table, and the figures showing the effect of a given plaster regardless of time are shown in the averages at the bottom of the table. The figures both at the right hand and bottom of the table are themselves averaged and by checking each other prove the correctness of the computation. They show that as the average of seventy-five tests with all plasters and all times of exposure plain steel loses 1-51—100 per cent. of its original weight by corrosion, and copper alloy loses 94—100 per cent. In other words the average ratio of loss by corrosion for plain steel and for copper alloy is as 1.61 to 1.00.

Another way of expressing the relative powers of resistance of the two metals is by average of the ratios of loss by corrosion of these materials in the different plasters. These ratios are shown directly under the average loss for each plaster. This method indicates that average loss by corrosion of plain steel and copper alloy in the various plasters is as 1.77 to 1.00. This figure, it will be noticed, does not agree with that showing the average of all tests. The reason for this is that the plasters which show a less rate of corrosion than others show also a greater advantage for copper alloy. For example, No. 2 plaster, which is the least corrosive of those tested, shows a ratio between plain steel and copper alloy of 3.62 to 1.00. This high value while it affects considerably the average of ratios by plasters affects but slightly the general average of all tests as it is based on very low rates of corrosion. It is for the reader to decide which figure expresses more truly the relative value of the two metals.



VARIATION OF CORROSION WITH TIME
PLAIN STEEL - o. COPPER ALLOY - x

The effect of time on corrosion is shown graphically in the accompanying diagram, which is based on the average of all tests at any given time for both plain steel and alloy. In this diagram the vertical spaces indicate per cent. loss by corrosion, while horizontal distances indicate time.

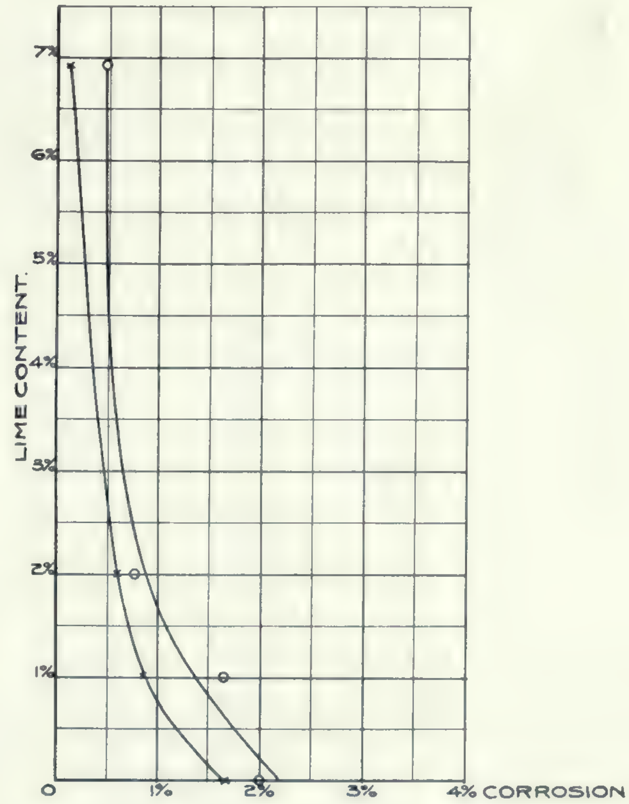
In both the plain steel and copper alloy the corrosion at seven days was more than seven times as great as that at one day. This is probably due to the well known fact that a steel surface has a very considerable resistance to rust until corrosion is once started but after the polish has been cut corrosion proceeds more easily and rapidly.

After seven days the rate of corrosion in both the plain steel and alloy falls off rapidly until the thirtieth day. This latter period in the case of copper alloy seems to mark very nearly the final point at which corrosion takes place. The rusting in the sixty days between the thirty and the ninety day tests is practically the same as the rusting which took place in the first day alone. This probably occurred in the first few days of the period. In the case of plain steel corrosion seems to be quite active after the thirtieth day. Thirty three per cent. of the loss shown in the average of the ninety day tests had taken place since the thirty day test.

It must be borne in mind that the figures discussed as the result at ninety days are the average of only fifteen tests for each of the metals. It is quite possible that a larger number of tests might slightly modify the figures given in these conclusions. It will be remembered that with the exception of No. 1, all the plasters tested are similar in composition. The only important variation is in the percentage of hydrated lime. This lime was found to have an important influence on the rate of corrosion.

TABLE SHOWING RELATION BETWEEN LIME AND CORROSION.

Plaster No.	Per cent. Lime	Loss by Corrosion. Plain Steel	Loss by Corrosion. Copper Alloy
4	0.00	1.99	1.66
5	1.00	1.66	0.87
3	2.00	0.79	0.61
2	6.92	0.47	0.13



VARIATION OF CORROSION WITH PERCENTAGE OF HYDRATED LIME
PLAIN STEEL - o. COPPER ALLOY - x

The foregoing table shows in parallel columns for the various plasters the average amount of corrosion and the percentage of hydrated lime.

Plaster No. 1 has been omitted as it differs in type from the others. It will be noted that when the plasters are arranged according to their lime contents they are also arranged according to their corrosive rate. In fact, the correspondence is so close that the rate of corrosion of an untested plaster could be predicted by interpolation within reasonable limits if its lime content were known. The relation between lime and corrosion is also shown graphically in the accompanying diagram.

This relation between lime and hard wall plaster corrosion is a hitherto unrecognized fact of great importance. A comparison between plaster No. 4 and No. 2 shows that the addition of 7 per cent. hydrated lime reduces the corrosion rate on plain steel to 24 per cent. of the rate shown by a plaster without lime. If copper alloy is used the rate is only 8 per cent. of the rate with unlimed plaster. The specification of a plaster containing 7 per cent. lime applied to copper alloy lath will reduce the corrosion to 6½ per cent. of what it would be were neither of these precautions observed. All of this is, of course, entirely independent of the protective coating of the lath. It would appear therefore that for metal lath the specification of copper alloy with a hard wall plaster containing seven per cent. hydrated lime should become a standard. As it may otherwise escape the attention of the casual reader, it is here stated that the importance of this discovery is out of all proportion to the space taken in describing it.

Unless the wall is actually wet it would appear that the presence or absence of sand in the plaster has no effect on corrosion. This is shown by consideration in the above diagram of the position of Plaster No. 3, which will be located by the fact that it contains two per cent. lime. It was tested neat, while the other plasters carried about two thirds sand, yet it fell into the place in the diagram that was appointed for it by its lime content.

The information gained from these tests may be summarized as follows: 1. With a saturated atmosphere, but without the presence of water as such, the richness of the mix of hard wall plaster has no effect on its rate of corrosion of metal lath. 2. The addition of hydrated lime up to seven per cent. (and probably more) reduces the rate of corrosion. 3. The use of copper alloy instead of plain steel reduces the rate of corrosion and also increases the efficiency of hydrated lime in this respect. 4. With a metal lath formed from copper alloy corrosion from hard wall plaster ceases in about thirty days. 5. The combination of seven per cent. of hydrated lime and copper alloy reduces the rate of corrosion to about one sixteenth of the rate shown when these precautions are not observed. 6. As compared with these simple precautions the use of a heavy gauge as a means of resisting corrosion is exceedingly inefficient and expensive.

Percentage of Loss by Corrosion of Plain Steel and Copper Alloy Bedded in Patent Plaster.

Note:—All percentages when specimens tested were other than twenty-seven gauge are reduced to equivalent loss of twenty-seven gauge material. Each figure is the average of three tests.

Plaster		1	2	3	4	5	Average	Ratio
Days.	Plain or Alloy.							
1	Plain	0.43	0.00	0.04	0.12	0.08	0.13	1.86
1	Alloy	0.16	0.00	0.02	0.09	0.07	0.07	1.00
7	Plain	1.37	0.12	0.57	1.94	2.22	1.24	1.77
7	Alloy	0.83	0.00	0.35	1.40	1.01	0.72	1.00
14	Plain	2.22	1.25	0.88	1.68	1.33	1.47	1.81
14	Alloy	0.99	0.10	0.93	1.34	0.71	0.81	1.00
30	Plain	3.06	0.16	0.80	2.82	2.41	1.85	1.22
30	Alloy	2.10	0.15	1.08	2.70	1.59	1.52	1.00
90	Plain	5.59	0.82	1.64	3.40	2.24	2.74	1.71
90	Alloy	3.08	0.40	0.75	2.78	0.98	1.60	1.00
Average	Plain	2.63	0.47	0.79	1.99	1.66	1.51	1.61
Average	Alloy	1.43	0.13	0.61	1.66	0.87	0.94	1.00
Ratio	Plain	1.84	3.62	1.30	1.20	1.91	...	...
Ratio	Alloy	1.00	1.00	1.00	1.00	1.00	...	...

Average of ratios by days ....—Alloy 1.00 Plain 1.67

Average of ratios by plasters..—Alloy 1.00 Plain 1.77

Ratio of average of all specimens tested—Alloy 1.00 Plain 1.61

THE following programme is given for the Federal Parliament House, one of the architectural units of Canberra, the projected capital city of Australia. The competition is open to architects of all countries.

Purpose.—The Government of the Commonwealth of Australia, having under construction the Federal Capital City at Canberra, desires to secure the services of an architect or architects to design, in harmony with the objects and policies of the general design for the city, the first of its important public buildings. The foremost of these buildings in importance and in order of construction is Parliament House, for which tentative designs are invited in international competition open to all qualified architects. If any premiated design additional to the first shall have been specially commended by the Adjudicators on account of exceptional merit, it is possible that the Commonwealth may subsequently commission the author thereof in connection with other buildings at the Capital; but it must be understood that such commendation does not entitle the said architect to any right for such future employment.

Conditions.—These conditions are mandatory, and failure on part of a competitor to conform to the same will exclude his design.

Qualification of Applicants.—Intending competitors are required to acknowledge receipt of Programme of Competition on accompanying Registration Form indicating responsible architectural practice in design and supervision of building construction. Satisfactory compliance with this condition will be a first essential to candidacy for employment in connection with the execution of this work. No adjudicator, nor advisor, nor employee of the Commonwealth of Australia shall compete or assist a competitor. No competitor shall submit more than one design.

General Information.—Registration Forms and Programmes can be obtained by addressing any of the following places:—Department of Home Affairs, Melbourne; Commonwealth Works Director, Sydney; and Public Works Departments in Adelaide, Brisbane, Perth and Hobart. London, Office of High Commissioner of Australia; Public Works Department at: Wellington, N.Z., Cape Town, Ottawa; The British Embassies at: Berlin, Madrid, Paris, Rome, St. Petersburg, Stockholm, Vienna, Washington.

Special Information.—Additional information, if necessitated by circumstances, will be forwarded by the Federal Capital Director of Design and Construction to all registered competitors.

Preparation.—All the drawings required shall be drawn with pencil or pen, without wash or colors, except plain washes if desired, to indicate sections or to block in openings, or to show different planes of distances. All lettering shall be of plain legible type. All rooms shall have figured dimensions. All drawings shall be cloth-mounted on stretchers. The only drawings to be submitted are:—

(1) *Plan of each floor of Parliament House
(2) *Longitudinal section of Parliament House.
(3) *Transverse section of Parliament House.
(4) *3 Elevations of Parliament House
*Drawn to a scale of 1-16-inch per 1 foot.
(5) Perspective from direction of "Terrace Court of the Reservoir," indicating relationship with proposed future Departmental and Capitol Buildings. Scale 1-16-inch per 1 foot at nearest angle on picture plane.
(6) Detail of one architectural feature of the building, selection optional.

A brief description, in print or typewritten, unsigned, must accompany the drawings, including a statement of the total volume of the ultimate building in terms of cubic feet. Cubage shall be computed to indicate as exactly as possible the actual volume of the building, calculated from the surface level or levels of the lowest floor to the highest points of the roof, and contained within the various outside surfaces of the walls. The actual volume of projecting features of all sorts, including parapets, towers, lanterns, bays, dormers, vaults, and exterior steps above grades shall be included, but covered open-sided porticos or loggias shall be taken at half their volume. Light wells of less than 400 square feet area shall not be deducted.

A figured diagram, showing method adopted in computing volume, shall accompany each design. Any language may be used at the option of the Competitor.

Submission.—Designs shall be submitted without revealing the registered address of the competitor or bearing any distinguishing mark, motto, or name which could serve as a means of identification, but with a sealed opaque packet firmly attached containing name and address of the author or authors, with a declaration that the design is his or their own personal work, and that the drawings have been prepared throughout under his or their own personal supervision. Such packet and the design to which it is attached will be given a common number on receipt, and the former will be held and opened after adjudication only by His Excellency the Governor-General or his deputy. Any attempt by an author to disclose his identity in any other manner will disqualify his design, and such design will not be included in the competition. The designs shall be delivered to the Federal Capital Director of Design and

Construction, Melbourne, Australia, or to the High Commissioner of Australia, London, England, free of cost to the Commonwealth, on or before 31st March, 1915. Omission to so deliver will involve disqualification, unless the Commonwealth Minister of State for Home Affairs is satisfied that the delay could not have been foreseen and is only for a period that will not interfere with the work of investigation.

Custody.—The Government does not accept responsibility as regards safe transit, custody, or retransit of the designs or any documents forwarded or delivered by a competitor, but it undertakes that all reasonable care shall be exercised to prevent damage during the period in which they are in its possession and that insurance will be effected based on its own estimate of value.

Publicity.—All designs and documents not excluded from the competition may be exhibited for reasonable period after adjudication, such exhibition to be open free to the public. Publication of designs, whether premiated or unpremiated, will in no way entitle competitors to any claim for compensation against the Government or its agents in regard to proprietary or other rights.

Return.—The winning design shall become the property of the Government. All other designs will be repacked and shipped, or posted for return to the several competitors. Each competitor will be advised of their despatch. Freight and other charges in transit will be paid by the Government to the address so named by the competitor.

Adjudication.—The drawings will be adjudicated by a jury of architects as follows:—George T. Poole, of Australia; John James Burnet, of London and Glasgow; Victor Laloux, of Paris; Otto Wagner, of Vienna; Louis H. Sullivan, of Chicago.

In case of disability of any adjudicator, his successor will be appointed by the Federal Capital Director of Design and Construction.

The jury will examine all designs submitted, determine as to their conformity with the mandatory conditions, and select eight (8) designs in order of merit and accord mention to such others as may be deemed especially worthy. The decision of the jury will be final, and its announcement will be made in Melbourne within three months of date of receipt of designs, or as soon thereafter as is possible. The report of the jury will state its reasons for the selection and classification of the designs, in order of merit, and a copy, accompanied by the names of the prize winners, will be sent by the Federal Capital Director of Design and Construction to each competitor.

Immediately upon the opening of the identification envelopes by the Governor-General the prize-winners will be notified by telegraph.

Premiation.—In accordance with the jury's award the Government of the Commonwealth of Australia agrees to pay within two months of adjudication premiums as follows:—To first in order of merit the sum of £2,000; To second, £1,500; to third, £1,000; to fourth, £500; to fifth, £250; to sixth, £250; to seventh, £250; to eighth, £250.

Employment of Architect.—The Government will employ the competitor placed first by the jury as architect for the initial portion of the building (note reference in 3.22); and so far as the subsequent stages of the ultimate building are concerned, it is the intention of the Government similarly to employ him. Insomuch, however, as the construction of the ultimate building may spread over a number of years, this statement cannot be taken to bind the Government to employ the architect in the later stages.

Extent of the Service Required.—The employment of the competitor as architect for the construction of the building, or any part thereof, is to include the preparation of all such working drawings and specifications in connection with the work to be constructed and the furnishing of all such information in connection therewith as the Minister for Home Affairs may require, and the furnishing to the Minister of necessary copies thereof and the supply of one permanent copy on tracing linen of the plans, elevations, and sections of the work as executed, and also a permanent copy of all corrected details of the work and figured plans and diagrams of all ducts, wires, pipes, and appliances for service systems inside and outside the building. If the Government decides to require personal supervision by the competitor employed as architect, he shall, in addition to the above, faithfully and diligently personally supervise the execution of the work, and perform all such architectural services in connection therewith as are necessary to insure the complete carrying out of his design. No departure from the working drawings and specifications is to be permitted without written approval of the Minister for Home Affairs.

Remuneration.—The architect will be remunerated for his services as follows:—

(a) If the employment includes personal supervision of the execution of the work, he will be remunerated in accordance with the schedule of percentage charges sanctioned and published by the Royal Institute of British Architects as at the date of the first publication of this programme in the *Commonwealth Gazette*; or

(*b*) If his employment does not include personal supervision of the work he will be remunerated at the rate of 3 per cent. on the calculated cost of the actual work undertaken.

CONSTRUCTION

A · JOURNAL · FOR · THE · ARCHITECTURAL
ENGINEERING · AND · CONTRACTING
INTERESTS · OF · CANADA

FREDERICK REED, Editor

H. GAGNIER, LIMITED, PUBLISHERS
Corner Richmond and Sheppard Streets,
Toronto - - Canada

BRANCH OFFICES:

MONTREAL—171 St. James Street
NEW YORK—156 5th Avenue

CORRESPONDENCE.—All correspondence should be addressed to "CONSTRUCTION," Corner Richmond and Sheppard Streets, Toronto, Canada.

SUBSCRIPTIONS—Canada and Great Britain, $3.00 per annum. United States, the Continent and all Postal Union countries, $4.00 per anum, in advance. Single copies, 35c.

ADVERTISEMENTS—Changes of, or new advertisements must reach the Head Office not later than the twentieth of the month preceding publication, to ensure insertion. Mailing date is on the tenth of each month. Advertising rates on application.

CONTRIBUTIONS—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and duly returned.

Entered as Second Class Matter in the Post Office at Toronto, Canada.

Vol. VII Toronto, October, 1914 No. 10

THE MONTREAL office of Messrs. Palmer, Hornbostel & Jones was discontinued on October 1st. Harry Edward Prindle, formerly Canadian representative of this firm, has opened an office at No. 915 New Birks Building, Montreal, for the general practice of architecture. Mr. Prindle is preparing plans for the new Union Station at Quebec, P.Q., for the Canadian Pacific Railway.

* * *

THE Conservation Commission is to be highly commended in its selection of Thomas Adams, noted expert of the British Local Government Board, to help the various Canadian municipalities in handling the large problem of city planning. Mr. Adams has been entrusted with the bringing about the planning of Greater London. In this connection the questions of determining the arterial roads is already under way with the 117 local authorities in Greater London and some 20 local authorities, just outside the metropolitan area. The total area represented comprises about 1,083 square miles, or 693,120 acres, and the population within the area is now nearing 8,000,000. Mr. Adams attended the International Town Planning Conference in Toronto in May and on his return to England wrote a very sympathetic appreciation of the efforts being made in Canada to accomplish town planning. He considers provision for shelter, for food supply, for work and for transit to be the fundamental things in communal life; next come facilities for education and last, though not necessarily least, the public playground and the civic centre. Mr. Adams will assume at once his duties as town planning adviser to the Conservation Commission.

* * *

"ABOUT the supposed crudities of American life and the lack of artistic perception, I had certainly been misinformed. I must say that I found New York interesting to a fascinating degree and in certain respects beautiful. The so-called sky-scrapers are in many instances not at all bad. The architectural tendency begotten by the exigencies of lofty construction has in it a good deal of originality. If I were to forecast a complete renovation of modern architecture I should say that the influence that would be most likely to bring it about would come from New York. And there is something in this thought that should minister to the just pride of Frenchmen, for the most eminent architects of New York are pupils of our own Ecole des Beaux Arts. I say to you now, much as it may surprise some of you, that skyscrapers may be agreeable to look at, and that many of them are beautiful. Of course I do not advise the immediate adoption of this system of construction in France, where the architectural physiognomy of the cities has been a matter of long development."
—*Prof. Bergson.*

* * *

THE DOLL HOUSE, conceived by Bird & Son, is an exceptionally clever example of the use of Neponset products. This playhouse of colonial design is well built, with solid wood frame, the sides being made of Neponset wall board; the roof of grayed slate color to represent shingles; the floors of Neponset flooring, part of which are covered with wall board strips; the windows of translucent fabric. The house is constructed so that all furniture can be easily moved in all the rooms on both floors. Measuring two feet six inches by one foot three inches by one foot seven inches, it demonstrates minutely the Neponset building products of fire-resisting values.

A CONCRETE ROAD has been laid providing a permanent highway to the plant of the Canada Cement Company of Montreal. The construction consists of several types and the specifications similar to those adopted by the Association of American Portland Cement Manufacturers. The actual work was done under the supervision of the Canada Cement Co. and consisted of fifteen sections, in some of which eight pounds of high calcium hydrated lime were added to each bag of cement and the two thoroughly mixed before placing in the concrete mixer. In the one-course sections containing lime, the lime was used throughout the entire thickness, but in two-course sections the lime was used in the top course only. All sections of the road are twenty feet wide—concrete fourteen feet and shoulders three feet. A four-inch tile drain was placed under the north shoulder. The proportions used for one-course concrete were 1:1½:3. For two-course concrete the proportions for the base were only 1:2½:5, and for the wearing course 1:1:1½. The sub-grade was rolled the entire width of twenty feet. The concrete is six inches thick at the sides and eight inches thick at the centre for all sections.

* * *

THE MARKED increase in disastrous fires is directing more attention every day to the need of fireproof building materials that can be relied upon. The failure of many so-called fireproof materials when subjected to the intense heat of large conflagrations suggests the need of more careful judgment in the choice of these materials as well as a more stringent interpretation of fireproof building regulations. The demand for building materials that would not be affected by fire has encouraged manufacturers to experiment with all kinds of materials, and one that has thus far successfully withstood all tests is a peculiar rock known as asbestos. Deposits of asbestos, in one or more of its allied species, are found to a limited extent in Russia, Italy, Egypt, India, South Africa, and, in fact, in all parts of the world. But that which is mined in Canada is about all that is of much commercial value, as other varieties are either too brittle to utilize or too hard to mine. By far the largest of these Canadian mines is owned by the H. W. Johns-Manville Co., of New York.

* * *

A NEW DREDGE is being built by M. Beatty & Sons for the Randolph Macdonald Co., Limited, of Toronto, of the boom and A frame type, with a three and a-half cubic yard dipper to work in thirty feet of water. The steel hull is one hundred and seven feet long, with thirty-six feet beam; nine feet three inches deep at the bow and eight feet three inches at the stern. The boiler, of the Scotch marine type, is ample in size to furnish steam for the entire plant when working under heavy load. The bow anchors, instead of wood, are made of steel plating, twenty-eight by thirty inches by fifty-five feet long, with a circular reinforcement on the inside, forced into place and firmly riveted. All the sheaves and bearings, as well as the anchor points, are of open hearth steel castings.

* * *

THE NEW galvanizing plant recently completed by the A. M. Byers Company at their mills in Pittsburgh contains the most modern and efficient equipment for manipulating the galvanizing process known to-day. Specifications call for hot metal process, a coating of highest grade prime western spelter, and a deposit one hundred per cent. heavier than that required in Government galvanizing specifications. A careful weighing and inspection before galvanizing; the device for turning the pipe in the baths; the extra long cleansing period; the pyrometer regulated kettles; the superior quality and absolute purity of the spelter, and the final weighing that assures the proper coating—each of these steps are specialized and handled by experts. Into its porous, uniform texture the spelter bites down deeply, coating thickly and evenly, minimizing possibility of flaking and assuring greatest life.

* * *

"WAR found us ready. In our stock-room in Toronto we have at the present time 965 chain-blocks in stock. Your orders by 'phone, telegram or letter will be shipped at once. The Herbert Morris Crane & Hoist Company, Limited." In musing over the above circular this thought presented itself; how many of the large business concerns will be able to say at the end of the war, "Peace found us ready"? It might be well for each company to consider the desirability of having an over-head stock when peace comes and in the meantime by so doing keep our country from becoming panic-stricken and our people from experiencing the embarassment of extreme poverty.

* * *

"CERTAINTY"

is what is sought for by everyone. With the Architect and Engineer this is particularly true

The Dietzgen Instruments and Materials are manufactured in our own Factories under the discipline of establishing Accuracy and Dependability; always with the idea of the exacting purpose for which they are intended, and not simply as merchandise to sell—to co-operate and verify with exactness the thought behind their use.

EUGENE DIETZGEN CO., LTD.,
116 Adelaide St. W., Toronto.

CONSTRUCTION

November, 1914 Vol. 7, No. 11

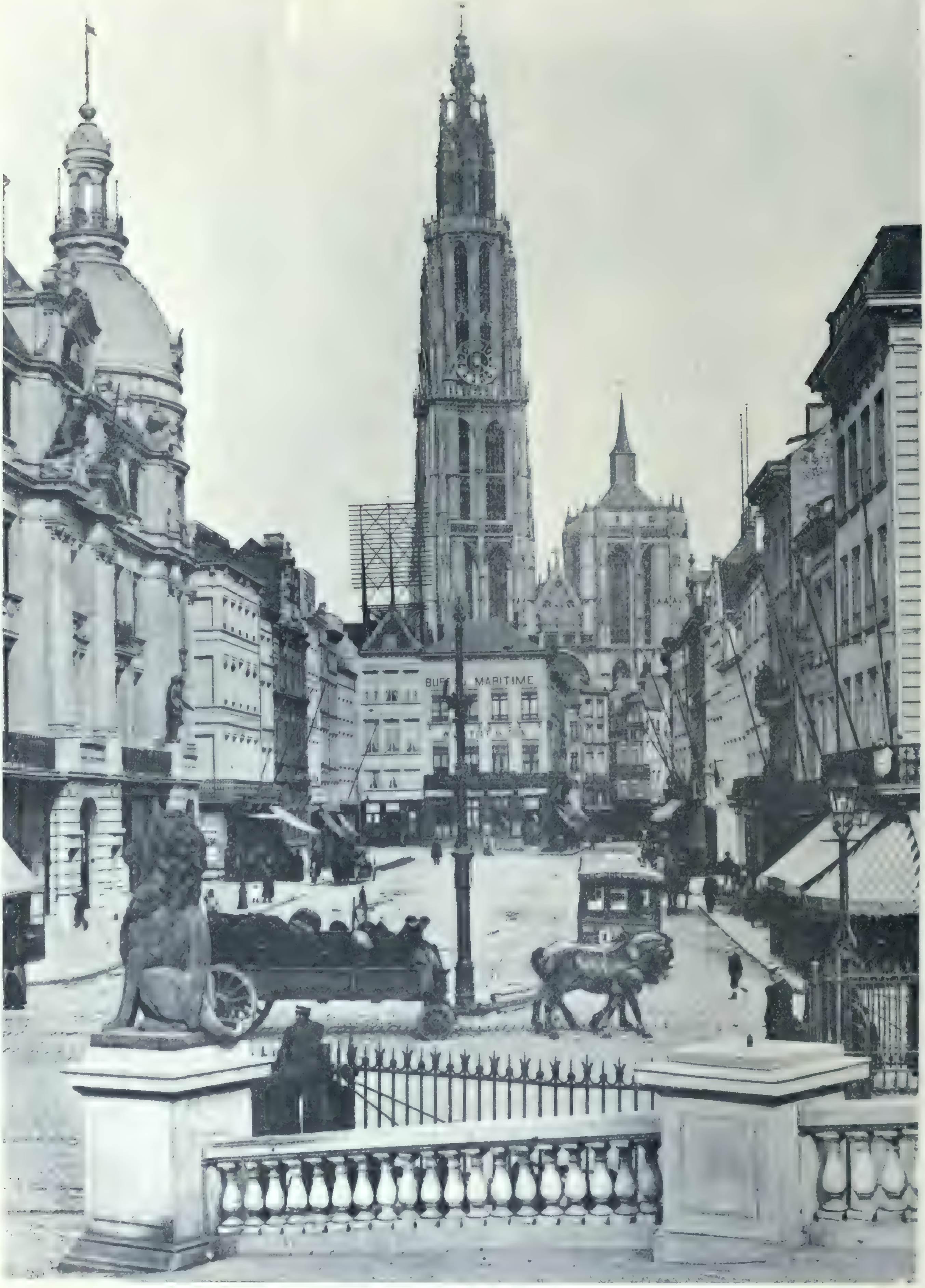
CONTENTS

EDITORIAL ... 393
Future outlook for Canadian civic planning——The destruction of Belgian cities by warring neighbors.
ARCHITECTURAL MONUMENTS IN THE WAR ZONE OF BELGIUM 395
SOLVING THE NARROW CITY LOT PROBLEM ... 412
THE ONTARIO ASSOCIATION OF ARCHITECTS ... 416
STANDARDIZATION OF SIZES OF ADVERTISING MATTER... 419
TRADE NOTES ... 420

Full Page Illustrations

VIEW OF PUBLIC SQUARE, ANTWERP ... Frontispiece
HOUSE ON WOOD AVENUE, MONTREAL ... 415
COLONIAL ENTRANCE, SALEM, MASS. ... 421

H. GAGNIER, Limited, Publishers
GRAPHIC ARTS BLDG., TORONTO, CANADA
BRANCH OFFICES
MONTREAL NEW YORK



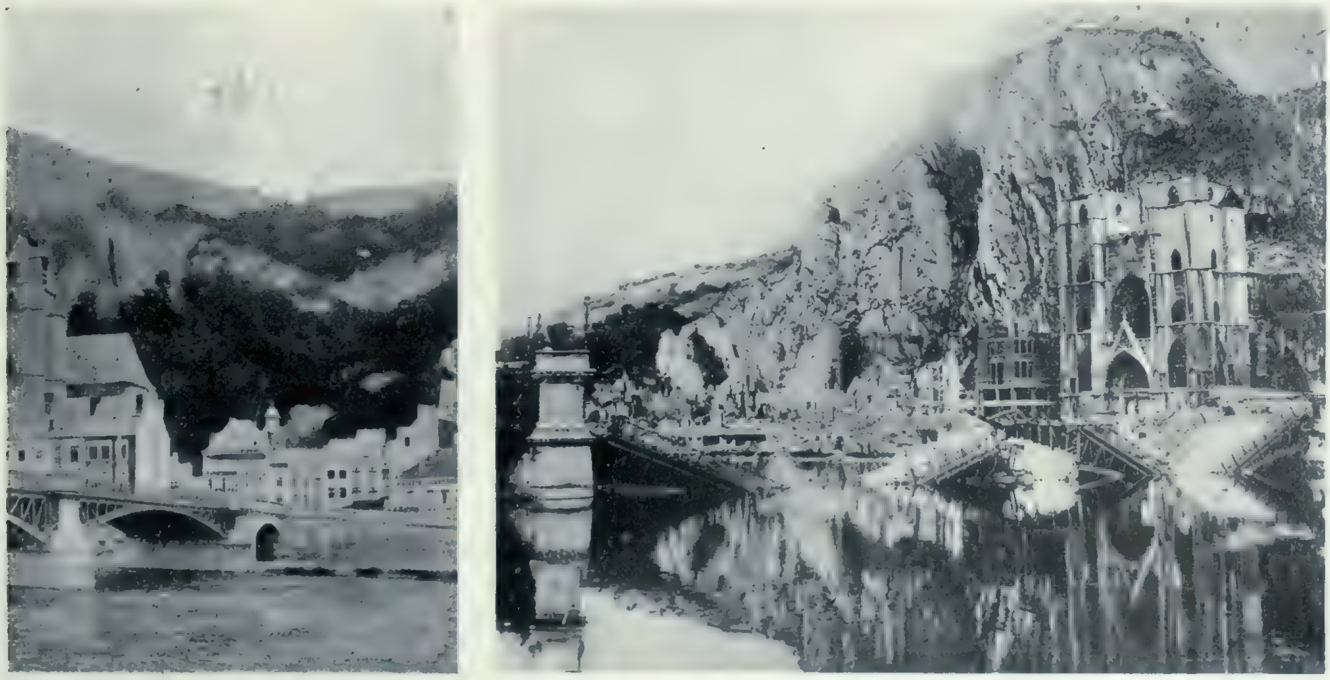
VIEW OF PUBLIC SQUARE, SHOWING
CATHEDRAL, ANTWERP, BELGIUM.

The future outlook for Canadian civic planning and Government work much brighter through appointments by Government and Conservation Commission.

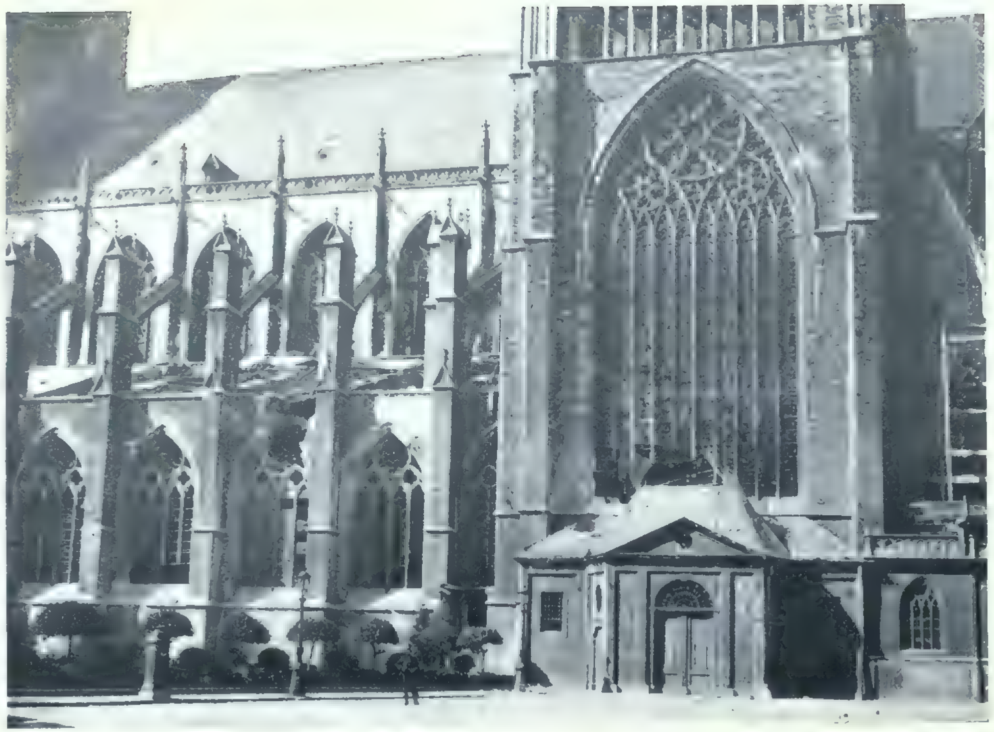
RECENT ANNOUNCEMENTS in the architectural world of the Dominion are indicative of a sane and wholesome progress along the line of civic improvements and public work. The efforts of the Conservation Commission in all phases of art merit the unstinted praise of every Canadian. Its scope is broad and the field unlimited. In May last the Commission acted as host to the International Conference on City Planning. It was at this gathering that Thomas Adams, head of the Town Planning Department of the Local Government Board in England, impressed the delegates with the necessity of conforming everything to the will of the people. Since then Mr. Adams has been engaged by the Conservation Commission to further civic improvements in Canada, and his past record convinces us that everything possible will be accomplished to rectify past mistakes and eliminate needless expenditures in the future. Another appointment of no less importance is the choice of Edgar Lewis Horwood for the position of Chief Architect of the Department of Public Works at Ottawa. Mr. Horwood is amply qualified for the task before him, possessing as he does an esthetic nature coupled with a keen appreciation for the practical. He will have the hearty co-operation of the Government as well as the good will of all architects and should be instrumental in raising the standard of architecture in Ottawa second to none among the capitals of all other progressive nations.

The practical and peace-loving nation of Belgium being gradually annihilated by the terrific struggle between the warring hosts of Europe.

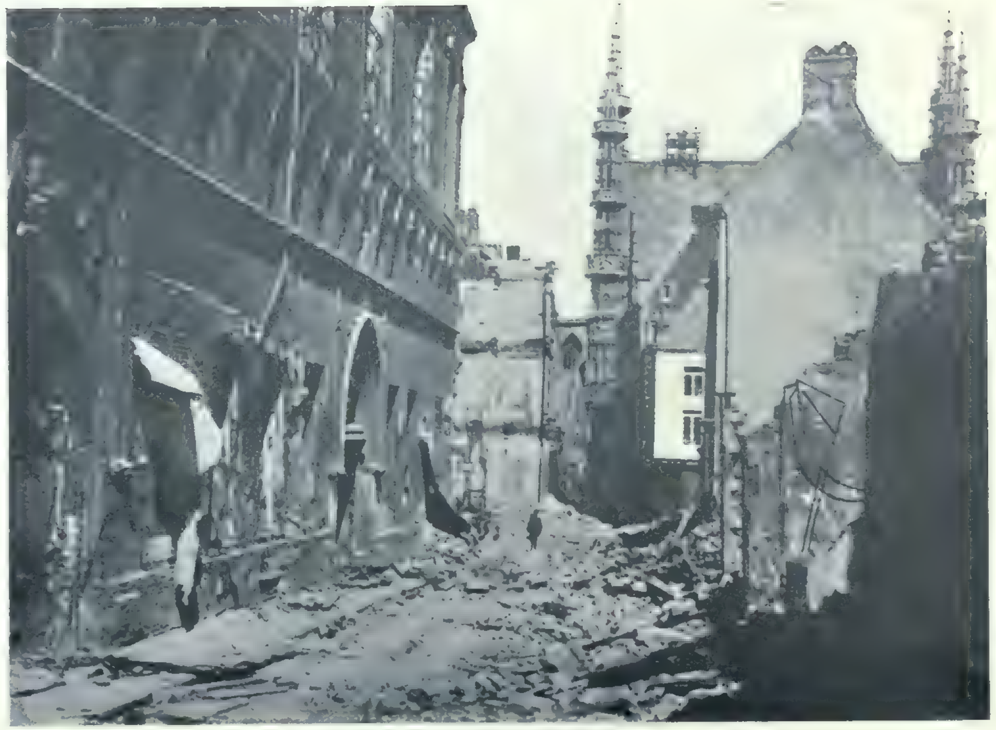
THE BELGAE, according to Cæsar, were the bravest of the Gauls, a fact clearly demonstrated during the past few weeks. Fighting for the neutrality of their country, then for their individual rights, and now for the privilege of owning a home and a Government; they reveal once more the spirit which sacrificed to the Roman legions their entire army of sixty thousand with the exception of only five hundred. The recent devastation wrought by the Germans is too well known for comment, but now comes the counter-action. The London *Times* correspondent says: "Observation from a British balloon has revealed how effective has been the fire of our warships on Ostend, Middlekerke, Lombaertzyde, and other coast villages. Not a single wall remains standing in the towns of Westkerke, Slype, and Novie. Several other places are also in ruins." From all that has happened, all that is transpiring, and all that will have to occur before this nation is rid of warring hosts, it is safe to predict that her vast monuments of peace and industry will be practically a memory. With her cities laid in ruins, her fields a barren waste, her factories blown to atoms, her best blood sacrificed in battle, will she be able to unite her scattered remnant and build once more the foundation of a free and prosperous nation? Surely this is the united prayer of the whole civilized world, and needs must be, for no righteous force can be completely submerged without blighting our much vaunted civilization.



DINANT, BELGIUM, BEFORE AND AFTER THE BOMBARDMENT BY THE GERMANS.

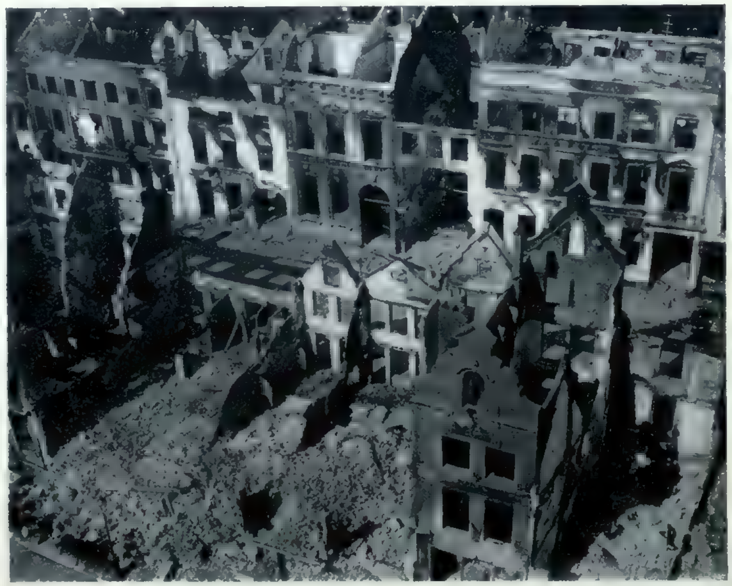


CATHEDRAL AT MALINES

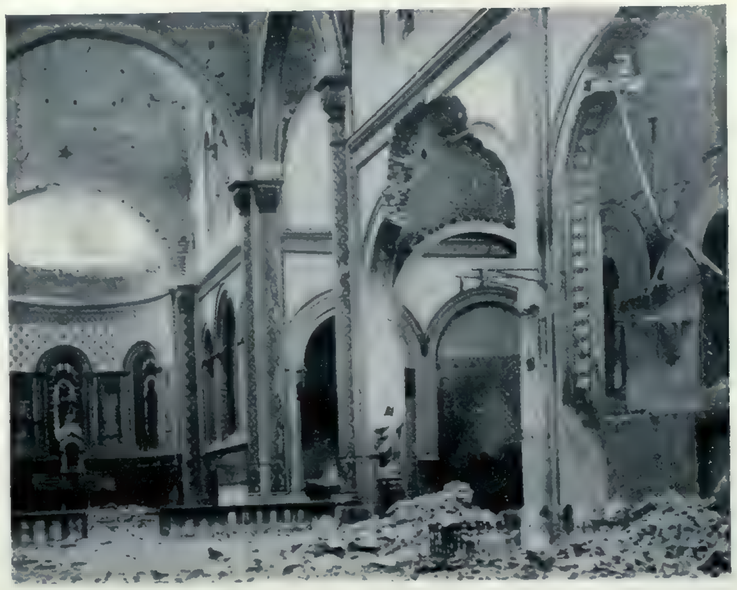


STREET SCENE AT LOUVAIN

DESTRUCTION OF BUILDINGS
IN THE
WAR ZONE OF
BELGIUM.



CITY OF
TERMONDE



CATHEDRAL
AT MONS

Architectural Monuments in the War Zone of Belgium

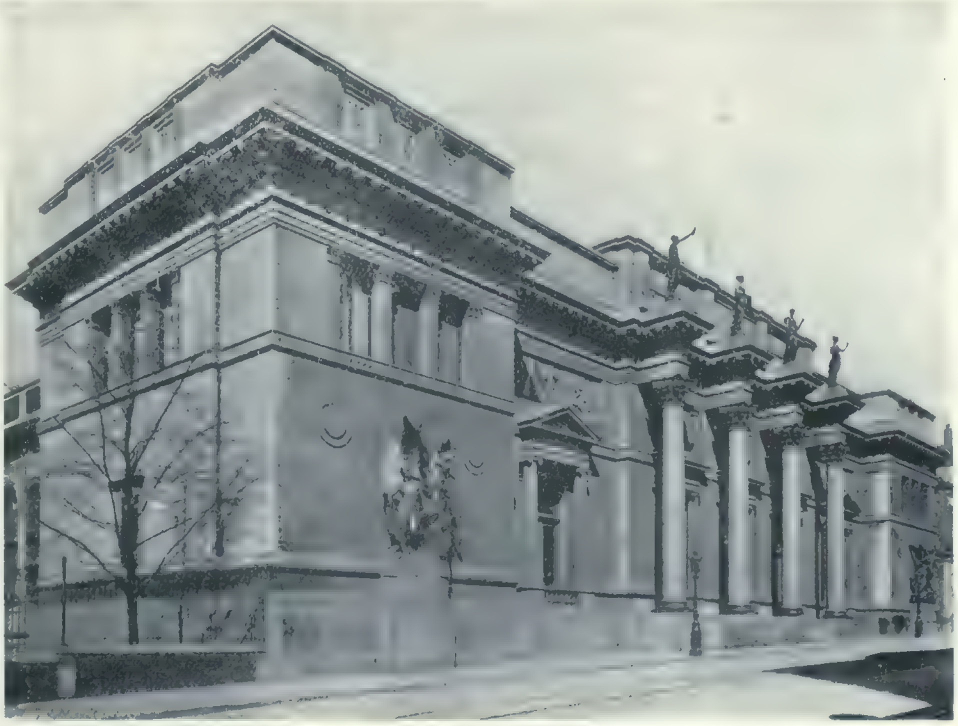
GROUP BY VANDERSTAPPEN.

PALAIS DES BEAUX ARTS AT BRUSSELS.

GROUP BY P. DE VIGNE.

IS IT ANY WONDER that the world stands aghast at the ruthless destruction of Belgian cities? For over seventy years there has been no internal discord, a fact all the more remarkable when we realize that this country is made up of two distinct races—the Flemings and the Walloons. One of the strong ties between these two peoples is their religion, so identical as to eliminate all contention and strife. And while we think of the Belgians as a whole, still the fact remains that both races retain their original language and the Flemings have changed but little since the days of the Plantagenets, while the Walloons in the east still retain their "Romance" tongue, or speak the French. The Flemings use a Tudesque language and undoubtedly are descendants of German colonists. Their influence stopped west of the Meuse river and as a result lost all connection with their mother country, a condition brought about by their complete separation through the settlement of the Walloons, a Celtic race closely akin to the people of ancient Gaul.

As early as 57 B.C. Cæsar defeated the Belgæ, whom he pronounced as the bravest of all people, on the River Aisne, where the Allies and Germans have been engaged for some time in desperate conflict. From this battle with the Roman legions only five hundred remained out of sixty thousand. Is it any wonder that the Germans have found this quiet and peaceful nation a strong barrier when once aroused? It is due to their stubborn resistance that Paris is not in German hands to-day, for with little opposition from them the capital of France would have been captured before ample strength could have been mustered for her defence.



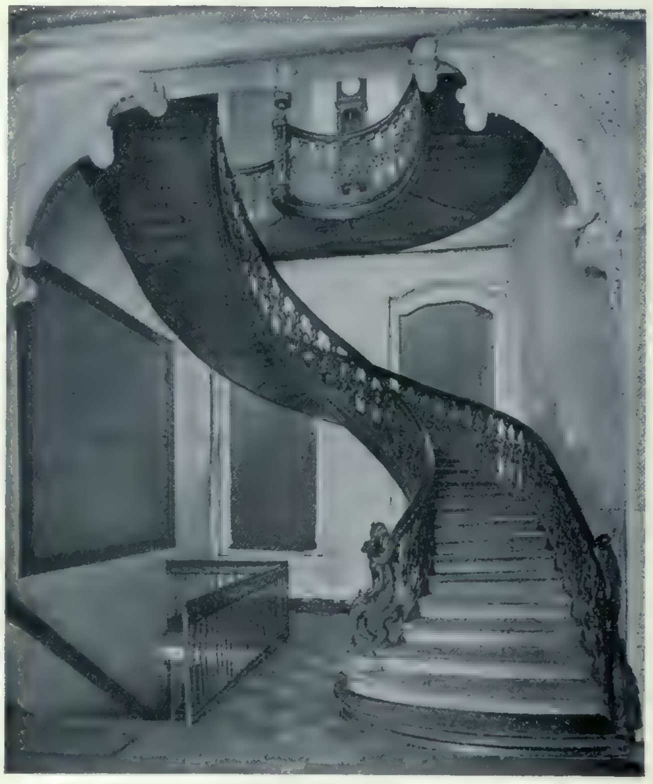
PALAIS DES BEAUX ARTS AT BRUSSELS.

In 69 A.D., Belgium and Holland revolted against the Roman Empire, which was the first of a continuous list of short, bloody struggles down to the thirteenth century, at which time she was part of the French kingdom. Gaining her independence in 1302, she retained same until the Spanish Succession, 1702. During this war she was one of the main battle grounds and her loss in art was extremely bitter. Philip of Spain issued an edict forbidding them to build their city halls and other ornamental structures, thereby taking away from them an opportunity to develop to the fullest extent their natural trend in architecture so manifest in the edifices of that period. Once crushed, it was gone forever.

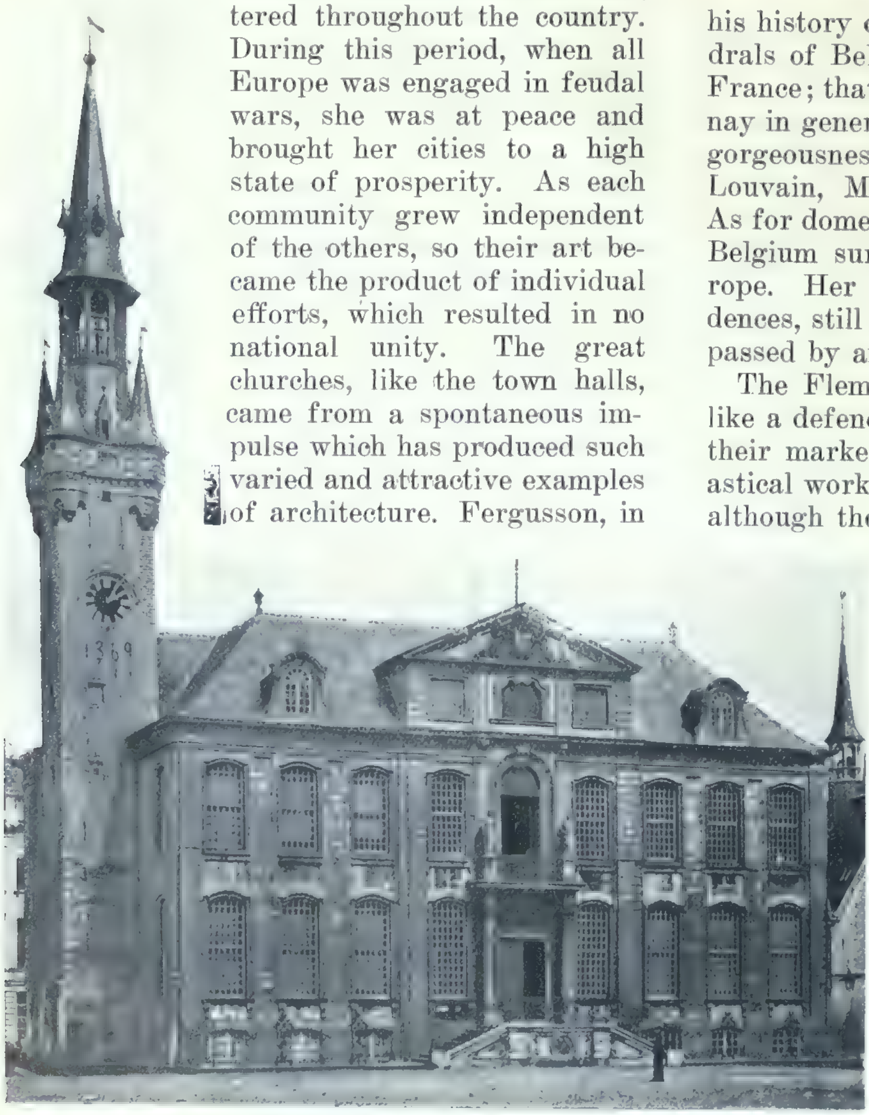
After Spain came Austria, who held possession until France overran it in 1794. France in turn was defeated in the battle of Waterloo, 1815, when the Kingdom of the Netherlands was established, which lasted until 1839, and in 1870 the neutrality and independence of Belgium was guaranteed by a treaty between Great Britain, France and Prussia.

Now as ever before, Belgium is suffering through the struggles of her more powerful neighbors. Already we see the terrible devastation of her recent struggle against the German forces, and from present indications what has been saved will undoubtedly suffer before the Allies succeed in driving the vast army of Germans and Austrians from her territory. Her citizens are homeless, thousands having fled to Holland, England and France; her trade has been ruined, and her works of art demolished.

The architecture of Belgium found its greatest growth during the middle ages and monuments of Belgian skill are scattered throughout the country. During this period, when all Europe was engaged in feudal wars, she was at peace and brought her cities to a high state of prosperity. As each community grew independent of the others, so their art became the product of individual efforts, which resulted in no national unity. The great churches, like the town halls, came from a spontaneous impulse which has produced such varied and attractive examples of architecture. Fergusson, in his history of architecture, says that the cathedrals of Belgium are equal in size to those of France; that no cathedral exceeds that of Tournay in general interest, and that of Antwerp in gorgeousness; nor do many surpass those of Louvain, Mechlin, Mons, Bruges and Ghent. As for domestic architecture of the middle ages, Belgium surpasses all other countries of Europe. Her town halls, markets, burgher residences, still display a taste and elegance unsurpassed by anything in this period.


STAIRWAY IN HOTEL DE VILLE AT LIERRE.

The Flemish burghers built their town hall like a defenceless feudal castle in the centre of their market place. It resembles also ecclesiastical work with the many windows and spire, although the latter was used as a source from which issued the call to arms. As someone has said, "The belfry is the symbol of a society, expecting happiness from neither a dynasty, nor from a military despotism, but solely from common institutions, from commerce and industry, from a citizen's life, budding in the shadow of the peaceful church, and borrowing its peaceful architecture from it. To the town and other halls belongs the place of honor among the monuments of Belgian architecture. Attractive through their character, they are equally so from their number. No other country in Europe offers so rich a variety in that respect."

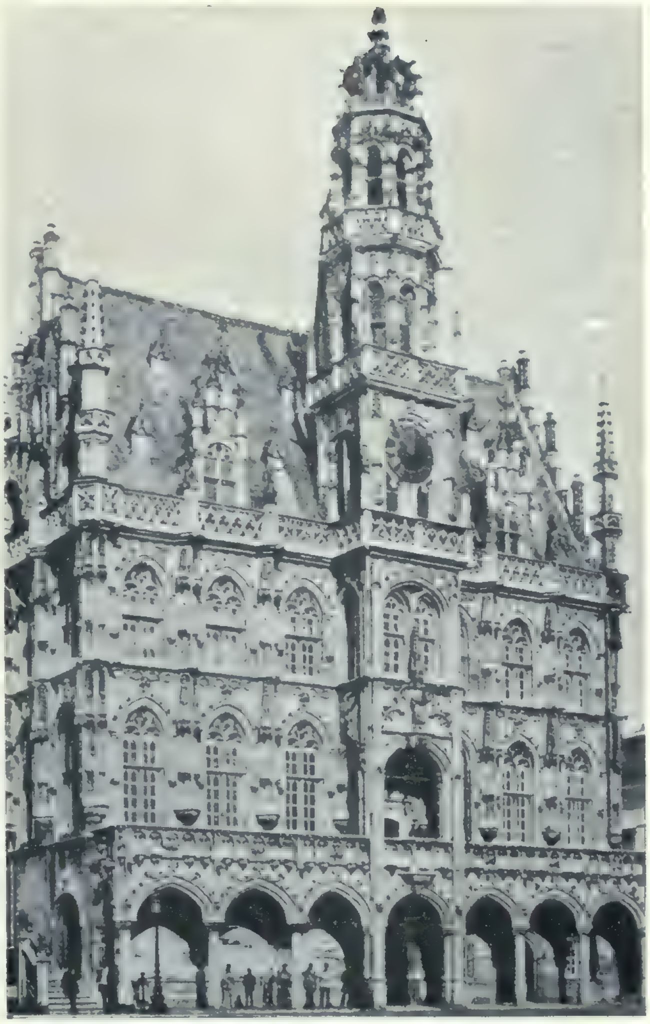

HOTEL DE VILLE AT LIERRE.

In referring to the peasant life—and more than half the population of Belgium resides in the country—the houses of the Walloons are more attractive than those in the western part. The former are built of stone and slate, while the latter are of brick covered with painted or tinted stucco. The ground floor consists of one large living room with a wash-house at the rear; the floor above contains two or three bedrooms and a well furnished attic. Belgium still retains a number of old chateaus like Mirwart and Dave with an imposing setting; also old country houses resembling the manor houses of England.

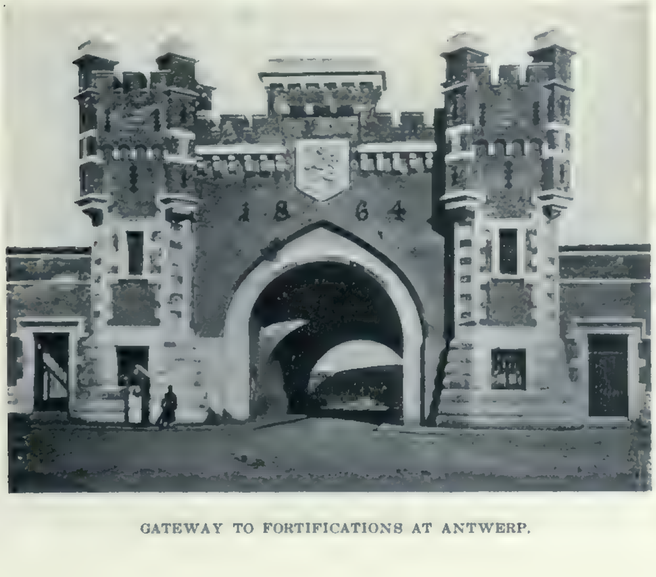
In order to follow the various places described we have taken them in the order of occupation by the Germans, as nearly as possible, starting with their invasion on the eastern border of Belgium.

Liege, on account of her magnificent situation at the junction of the Ourthe and Meuse rivers, her unusual history and the activity of her people, ranks as the most remarkable city in Belgium. She is the natural capital of the Walloon country, setting on the side of a mountain which holds the famous citadel. Twenty-nine out of forty churches remain standing as a living monument to her former prosperity. St. Denis contains a wooden altar piece of figures in high relief set in elaborately carved canopies. It is an excellent example of the early work and reveals the skill of the fifteenth century unequalled in later times.

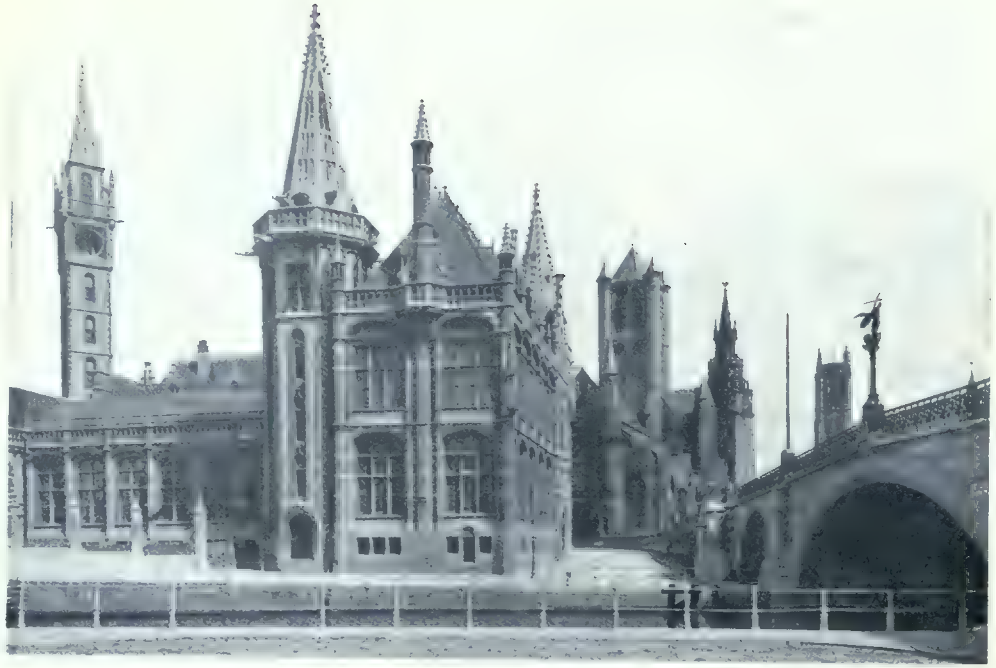
Namur is beautifully situated in the sloping valley on the Sambre river, and noted for the imposing aspect of its citadel, firmly established on a high rocky promontory. The fort was the feudal castle of the Counts of Namur, and has remaining a section of the wall and three circular towers which suffered eight sieges up to the fourteenth century. As described by a recent visitor, the view from the citadel, though not very extended, is sufficiently beautiful to repay the ascent. Namur shows itself from this vantage ground precisely what it is, a cheerful, irregularly built town, having no pretensions to the picturesqueness of ancient monuments, but yet by no means commonplace or ugly, and placed in an irregularly beautiful situation. Out of the sea of lilac and pinkish-brown roofs, and the bright green heads of the acacia trees, rise a few old towers. First the *Beffroi* of St. Jacques, which dates from 1388, containing the *cloche porte*, which summoned the citizens, rang for the closing of the gates at evening, and so on. Then there is the tower of St. Jean Baptiste, beneath whose shadow the fruit market is held; a very respectable old square tower, surmounted by a bell-shaped roof or cap, dating, it is true, only from 1616, but in a picturesque state of arrested decay, which makes it look more venerable than it is. There is no prettier corner in Namur for an artist's brush than the little *marche* here on a fine summer's day, when the market women in their white caps and blue gowns sit round the place, presiding over their vegetables and fruit, and the bright-colored groups and the round heads of the brilliant green acacia trees show up in the sunlight against the shadowed side of the tower, where it has been banked up with earth, while the swifts fly in and out of the arcaded upper storey.



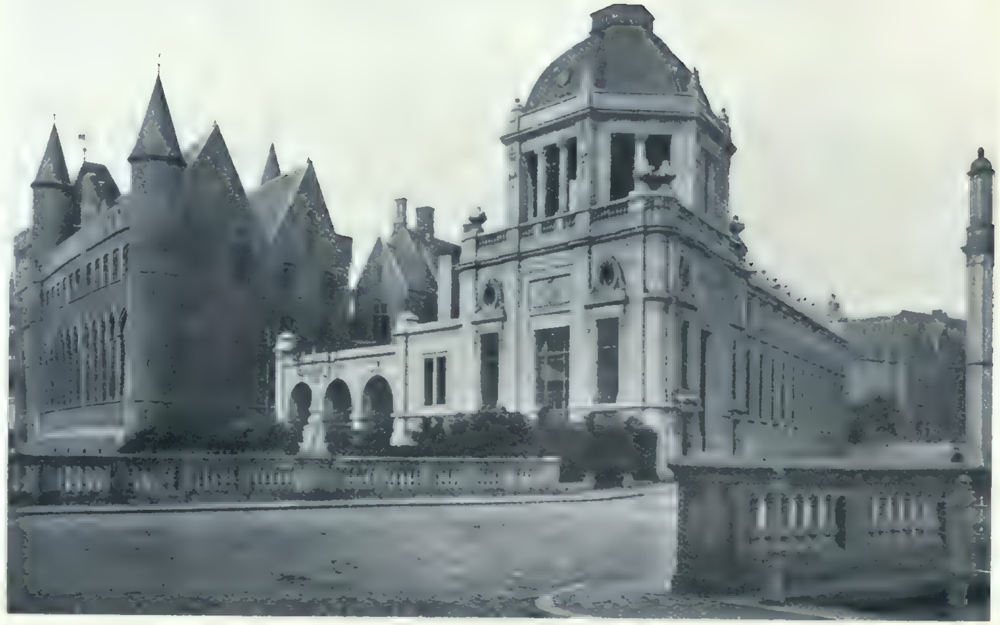
TOWN HALL AT OUDENARDE.



GATEWAY TO FORTIFICATIONS AT ANTWERP.

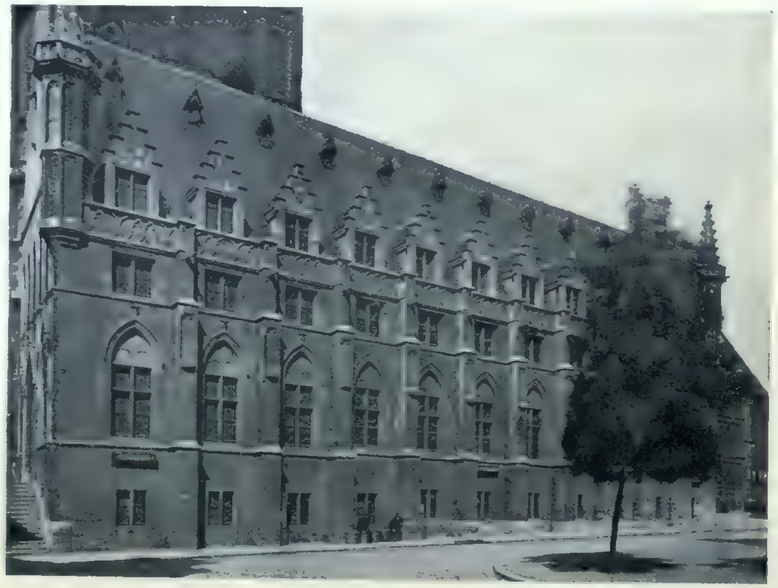


HOTEL DES
POSTES

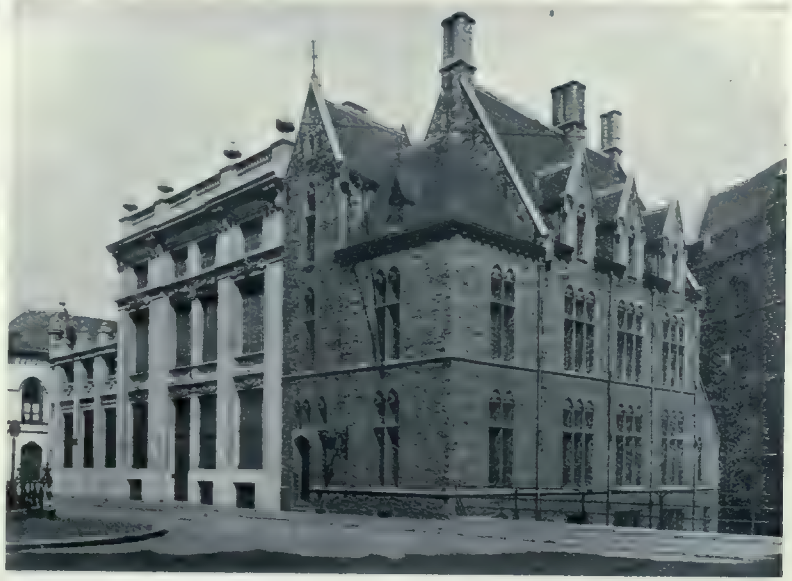


BANK
NATIONALE

FOUR
PROMINENT BUILDINGS
IN
GHENT, BELGIUM



HALL OF
CLOTHIERS' GUILD



CHATEAU OF
GERARD LE DIABLE

It is a picture such as old Prout would have loved to paint.

No description of Dinant, the illustration of which on our editorial page shows the disastrous effects of the recent bombardment, could be better stated than the following account from one who made a recent tour along the Meuse river:

The approach to Dinant by the river is uncommonly pretty, especially if you drift in by the evening boat on a fine day. Then the irregular but rather commonplace buildings that line the banks on either side show more picturesquely; the fine old church looks solemnly down, while the angular masses of the fortress on the edge of the precipitous cliff immediately behind it catch the last glow of the sunset that dyes the smooth water from a flash of reflected rose from the upper sky. The little town is built chiefly on the right bank, and runs a straggling line of houses for a mile or two up the river on the narrow space which the jutting limestone rocks leave free. A stone bridge crosses from the left bank, on which the railway lies, to the little Place, where the market is held as usual by the side of the church. The old church itself is undergoing a great process of repair. The rich Gothic mouldings of the south and west doors are in a mutilated condition. On the north side the remains of a corresponding transept door have been revealed by recent removals, but the reliefs and decorative detail are ground down to a mere vestige. The chapel on the south side of the choir, used as a baptistery, has a round arch, with the rude Romanesque sculpture and capitals of the shafts that belong to the earlier period of the church's history, but the interior generally shows considerable marks of having been pulled about at various periods. In spite, however, of discrepancies and restorations, the interior of this old church of Notre Dame de Dinant is very striking. The great height, the happy proportions, wide transepts, and beautiful open apsidal choir of five bays, the vault of which is supported on six slender columns, the continuous and handsome triforium, and the warm grey color of the stone, unspoilt by painting, make up an uncommon and noble interior. Of the old wooden houses for which Dinant was once famous, but few are left. We found a couple, used as a tannery in a back street, still covered with pretty geometric patterns in panels, but both in a shaky condition.

In Louvain, so ruthlessly destroyed by the Germans, the people still speak Flemish, and books are published in this language. Here are found many examples of old Flemish church art, such as the "Last Supper" by Bouts; flamboyant gothic rood-loft, 1490; and others none the less valuable. The town hall excels in its beauty of proportions and wealth of ornamentation, reaching the highest point of ornate civic Gothic. Built by Matthew of Loyens between 1450 and 1465, it contains one more story than usual, has a loftier flight of steps, and possesses six gossamer-like spires. The arrangement of the statues is interesting, the Dukes of Burgundy and the Counts of Flanders being in the upper row, while the warriors and statesmen of the country are next and the townsmen beneath. Elaborate sculpture work is found in the corbels which support the various statues. In addition to the university, other buildings of an interesting character could have been enjoyed before the war. Other special features worthy of mention are the carved oak wooden stalls, fifteenth century, in St. Gertrude's Church, among the finest in Belgium.

HOUSE AT SCHAERBEEK, NEAR BRUSSELS.

Brussels, originally Brocksele, is mentioned as early as the eighth century and grew to such importance that Wenceslas in 1357 ordered the new wall built about the city, which was intact until the Belgian revolution in 1830, and in 1383

VILLA AT NIVEZE, NEAR SPA.

it was made the capital of Belgium by the Dukes of Brabant. Of the mediæval structures, three churches, the Hotel de Ville, the Maison du Roi and the palace of William the Silent now used as a royal library are among the most prominent. The Church of Ste. Gudule, 1220, is one of the finest specimens of pointed Gothic and contains some rich stained glass dating from the thirteenth to the fifteenth centuries. Facing the Grand Place, one of the most interesting public squares in Europe, is the Hotel de Ville, with its rich facade of the fifteenth century, and the Maison du Roi, extremely ornate.

Malines, situated midway between Brussels and Antwerp, is mourning the destruction of its Church of St. Rombaut, which is even more satisfactory in its ensemble than the cathedral at Antwerp. The spire, three hundred and twenty feet, was never completed, while upon the interior round pillars are used instead of clustered columns. A special charm is lent by the immense depth of its buttresses and the boldness of its outline. It also contains an excellent carved pulpit and an altar piece of the crucifixion by Vandyck, considered to be one of the finest pictures in the world.

The Hotel de Ville at Lierre was built in 1741 by Bourcheit, containing a basement and two stories. The main entrance is reached by a series of steps enclosed with an artistic iron grill of the eighteenth century, above which is a balcony adorned with two modern statues, and an attic treatment containing the arms of the city. It is of gray stone with trimming around the windows and doors of blue stone. On the first floor is a large vestibule containing a remarkable stairway in oak and is a masterpiece of carving after the design of Van Eberbroeck in 1775, also a decorative Louis XV ceiling. An interesting feature is the octagonal spire set upon the square tower. It has been accomplished so well as to merit the statement that it is one of the most beautiful towers in Belgium.

The Church of Saint-Gommaire, said to be practically destroyed by the recent bombardment of the city, is ranked high in the ecclesiastical work of Belgium. The tower, like the belfry of the Hotel de Ville, is octagonal on a square base; the ornament being delicate and harmonious. It is tied to the church by three large arches, which compelled the architect to make the first two piers of the nave much larger than the others in order to sustain the extra weight, an architectural and engineering problem well handled in the fourteenth century. The nave, which is more elaborate and far richer in detail than the tower, belongs to the fifteenth century.

The strongly fortified city of Antwerp, which displayed little resistance to the siege guns of the enemy, possesses one of the most interesting histories of Belgian cities. Accessible by water, she became employed by the Spanish and Portuguese, attaining the zenith of her prosperity under Charles V. After the opening of the

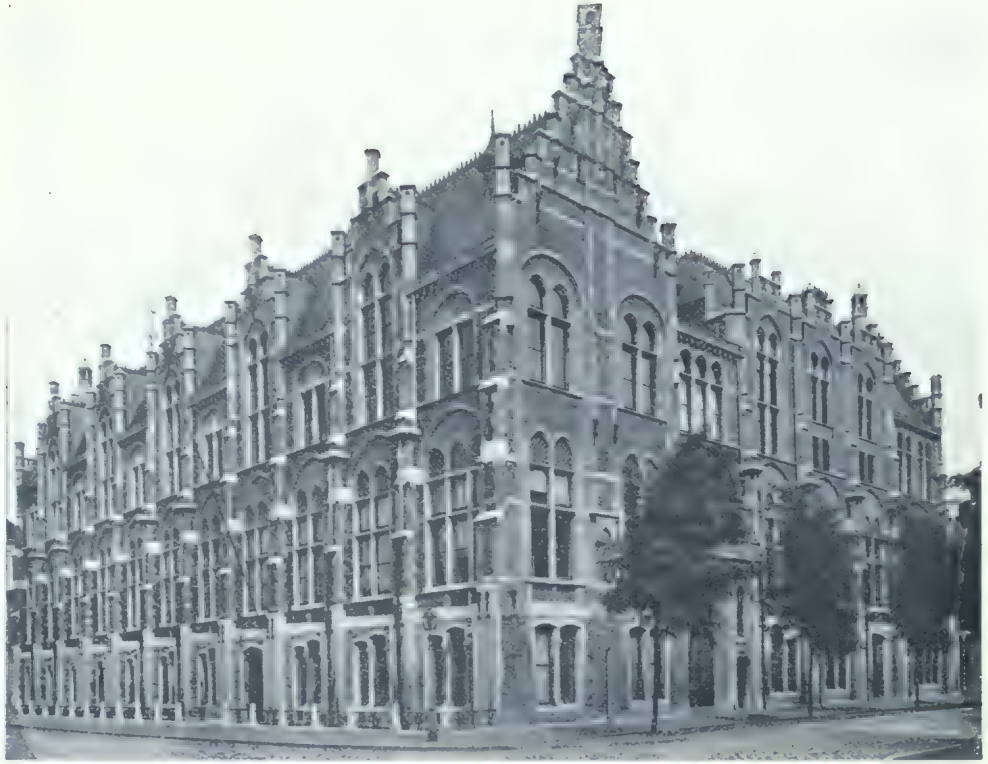
VILLA AT UCCLE, SOUTH OF BRUSSELS.

Scheldt in 1863 her population increased from 100,000 to approximately 325,000. Open to the largest steamers, she has become one of the principal seaports of Europe. Boulger, in referring to Antwerp, states that the wealthier of her merchants reside in fine and attractive-looking houses which border the broad boulevards laid out over the line of the ancient wall. These houses are singularly bright, and many of them are highly artistic. Unlike the Brussels mansion, which is uniformly white, except in the new parts of the town, the Antwerp residence is generally brick of several colors with bright green wooden shutters. The boulevards form a semi-circle in the town, extending from the new picture gallery on the Place du Peuple in the south to the Grand Bassin in the north, while the centre is occupied by gardens, statues, broad driveways, etc. The line of boulevard extends over three miles, all the more impressive when contrasted with the narrow and tortuous streets in the older parts of the town.

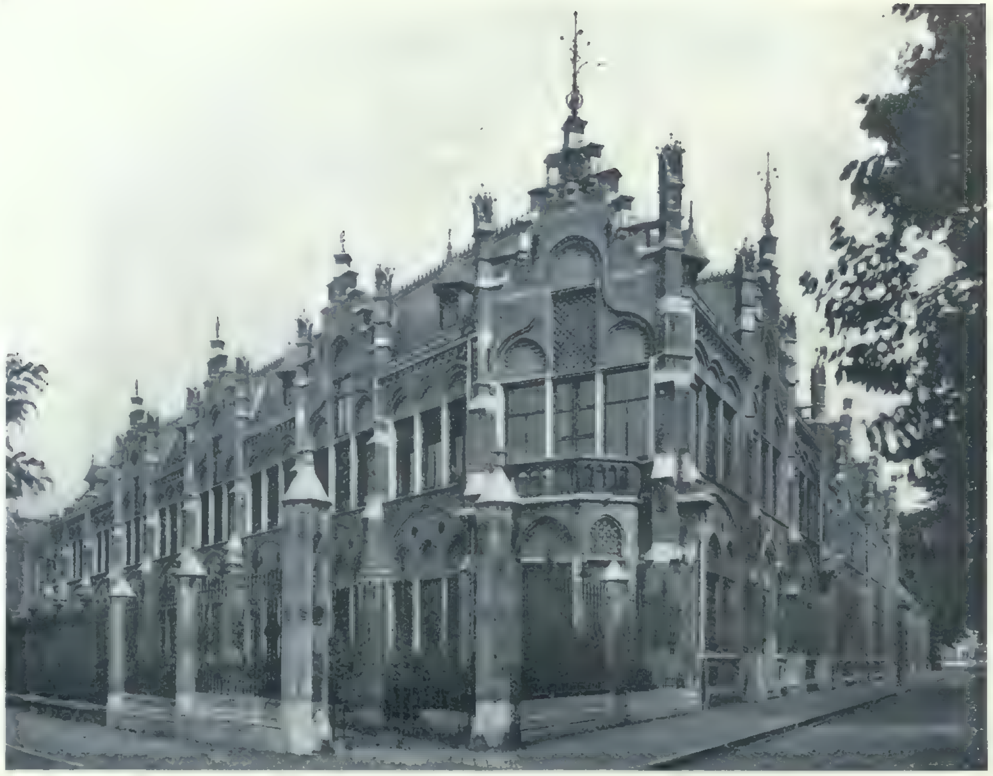
The Cathedral of Notre Dame in Antwerp, 1352-1411, is one of the largest and most beautiful specimens of Gothic architecture in the Netherlands. The interior is simple and imposing, having seven aisles and measuring three hundred and ninety feet long, two hundred and fifty wide. The great attractions of this church are the paintings by Rubens, which were removed recently to escape injury by the Germans, titled "The Descent from the Cross," "The Elevation of the Cross," and "The Resurrection." As for the magnificent steeple, over four hundred feet high, Charles V said it deserved to be kept in a case, while Napoleon compared it to Mechlin lace. Begun in 1422 by Jan Amelius and completed 1518 by Appelmans, the construction consists of iron with stone fastened to it like beads, the spaces between being filled with plaster. The tower possesses sixty bells, the largest weighing sixteen thousand pounds and requiring sixteen men to make it sound.

The Hotel de Ville at Antwerp, 1581, by Cornelius de Vriendt, is a splendid example of the Renaissance style, highly ornamented in the centre with double columns between each window and rising to a height of one hundred and eighty-five feet. An open gallery occurs under the roof with square pillars and bracket capitals, affording shadow without unnecessary projection and appropriately crowning the walls. The building is free from all needless ornamentation with each feature extremely impressive. Among other structures should be mentioned the Theatre and National Bank buildings. The new Flemish theatre has been likened to a Greek temple with a lower story, influenced greatly by the Paris Opera House. In the National Bank the Flemish Renaissance has superseded the Italian, due to Beyaert, the designer. The execution of this mansion effect is excellent and lends dignity to this modern institute.

Ghent also has a varied history, at one time being the capital of the Belgians and a power in



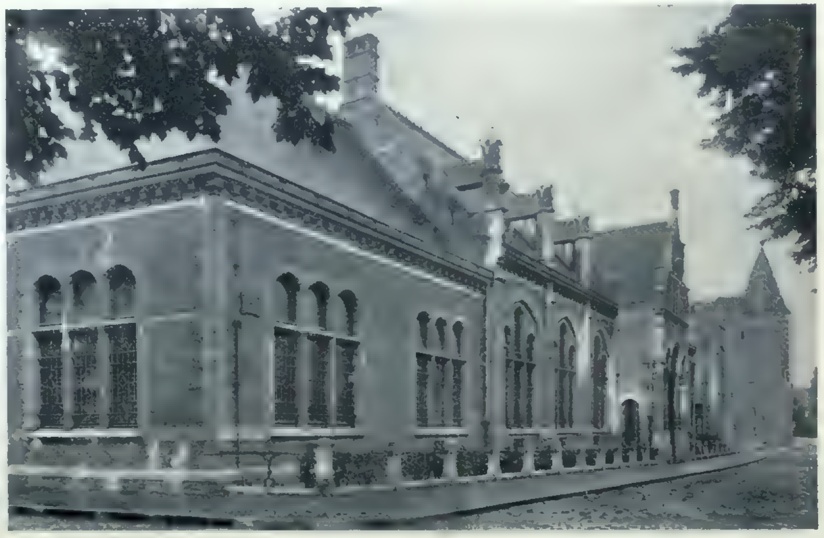
MEDICAL INSTITUTE



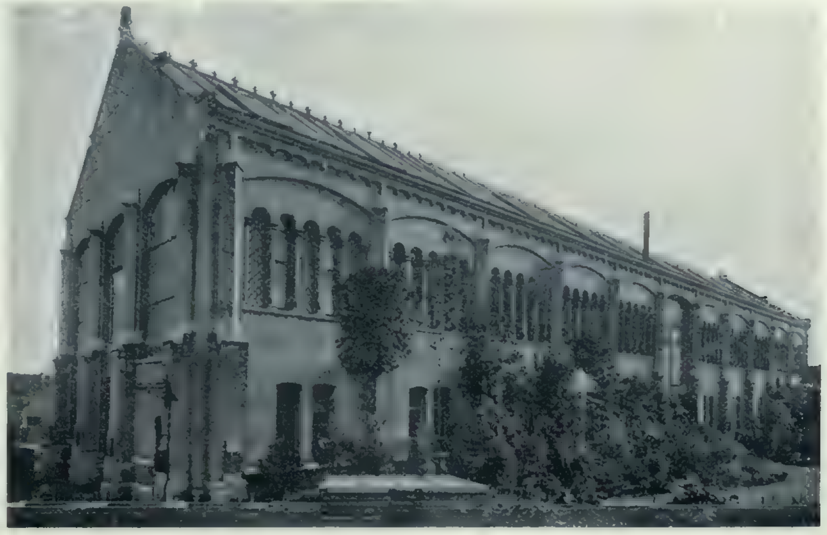
PHARMACY INSTITUTE

L'UNIVERSITÉ DE L'ETAT, GHENT.

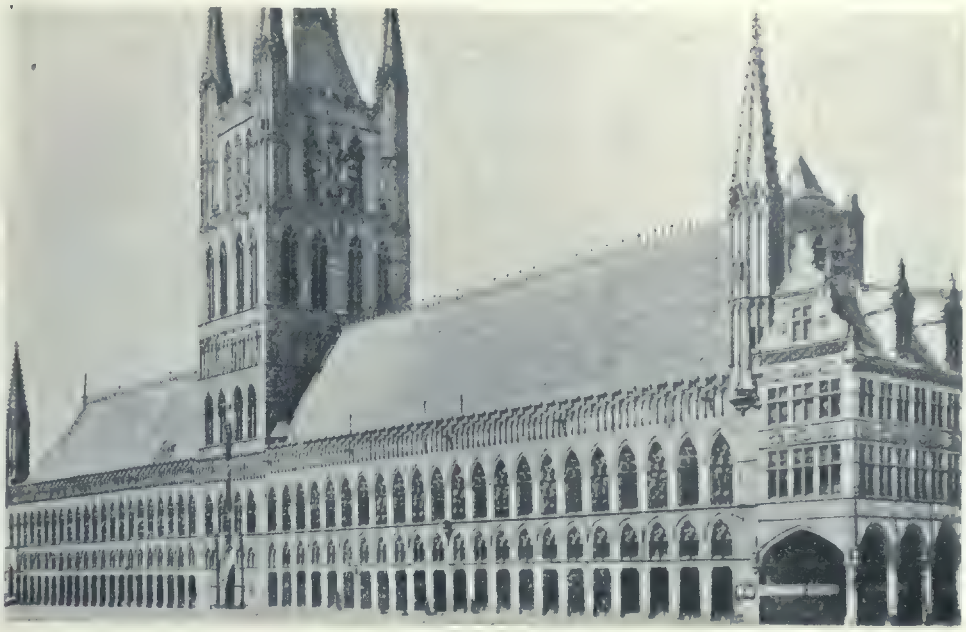
LOUIS CLOQUET, ARCHITECT.



PHYSIOLOGY INSTITUTE



BOTANICAL INSTITUTE



HALL OF THE CLOTHIERS' GUILD AT YPRES.

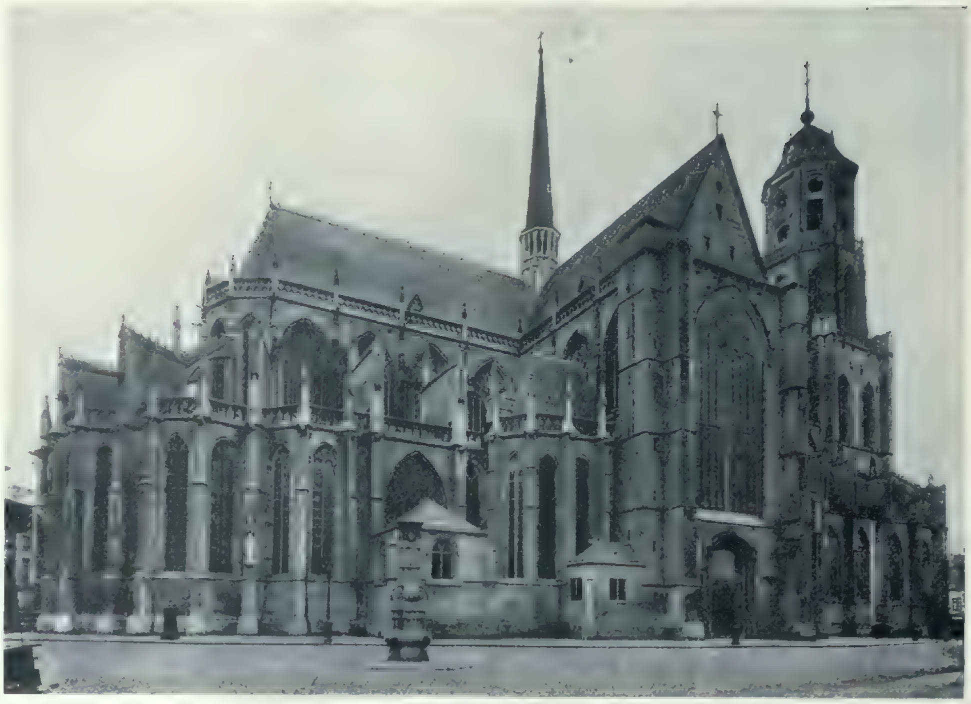
herself up to 1540, after which she sank to a second rate town. Her means of water communications in many different directions allowed only a temporary decadence, and by means of agricultural and manufacturing pursuits she has grown to a population of 167,000. The Cathedral of St. Bavon is the most conspicuous building, the exterior quite striking in its heavy ornateness, while the interior is a striking contrast in its refinement. The Hotel de Ville, erected in 1518, is credited as being the best architectural work in the city. Facing the Rue Hautport is the magnificent facade of Flamboyant Gothic and overlooking the market is the one in Renaissance, both executed in the sixteenth century. The belfry contains a carillon of forty-four bells, used originally to send forth the song of victory. The city contains a large number of recent structures, among the more important of which are the buildings of the University, designed by Louis Cloquet. The Medical Institute, presented by the eminent Dr. Rommelaere, comprehends the work of hygiene, bacteriology, and medicine, and forms a large quadrangle with the Institutes of Physiology and Pharmacy.

The cities of Bruges, Courtrai and Ypres have been classed as dead cities, as they have not shared in the industrial revival of the last fifty years. In the case of Bruges its mediæval appearance is better preserved than that of any other city in Belgium. For this reason it becomes an ideal retreat for artists. Most of the buildings are of brick, some elaborately executed and of extreme interest, while the finely wrought iron ties are everywhere introduced to enhance the effectiveness of the exterior design. Among the important buildings might be mentioned the Cathedral of St. Sauveur, and the Church of Notre Dame, both examples of early pointed Gothic; the hospital of St. Jean; the Hotel de Ville, the Chapelle du Saint-Sang and the Church of St. Jacques. The town hall, built in 1377, is the oldest municipal court of justice. With a frontage of eighty-eight feet and a depth of sixty-five, it forms a simple and pure design for the picturesque tower rising approximately three hundred feet above, long famed for its chime of bells. The niches of the main facade contain statues of the Counts of Flanders.

Courtrai has an exceptionally pleasing Hotel de Ville, built in 1527, which still retains its original feeling in spite of recent restorations. The proportions of the windows; the balcony from where the tribune addressed the people; the detail, all tend to give a severe and harmonious effect to the ensemble. Several features of interest are to be seen within, especially the tablet of Robbe and the bas relief of Devreese, representing the death of Cæsar, both at the top of the heavy stone stairway. The chimney is quite monumental and very original, with its

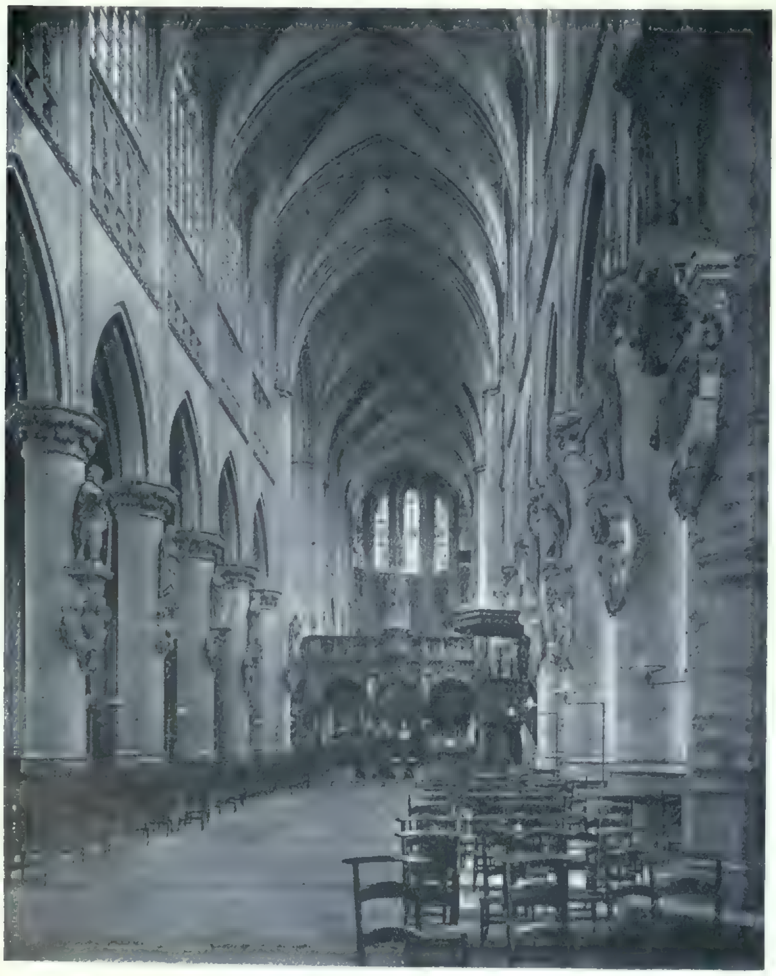
MAISON DU ROI AT BRUSSELS.

figures sculptured in the style of the thirteenth century.



EXTERIOR OF SAINT GOMMAIRE AT LIERRE

Ypres, which contained a population of 100,000 during the fourteenth century and ranked first in the cloth making of Flanders, is now serenely content with 17,000 citizens. Of the former prosperous period two interesting buildings remain, the Clothmarket Hall and the Cathedral of St. Martin. The Hall, of the thirteenth century, is the earliest and most magnificent market house in Belgium, possessing a simple facade some four hundred and sixty feet in length with a double row of ogival windows, two small turrets at the ends and a belfry in the centre. Upon the interior is one vast room with long galleries and halls above. One French writer has said that the Hall by its dimensions equals the majesty of cathedrals, by its beauty of lines the Venetian palaces, and by its richness of ornamentation the construction of the Moors in Spain.



INTERIOR OF SAINT GOMMAIRE AT LIERRE.

The Church of Saint Martin, with its triple entrance, its arched buttresses of graceful reach, its elegant steeple, the remarkable choir of the thirteenth century, all tend to make it one of the best examples of this period. The difference of plans between the windows of the upper part and the columns of the pointed arches in front give it the aspect of an Italian loggia. Many other buildings commend themselves to the student of art such as the Hotel de Ville, with the different decorative cartouches at the windows and the consols of the cornice representing human heads; the Hotel Merghelynck, one of the finest examples of eighteenth century art; the Hospital of St. Godelieve with its rich Renaissance hall and elaborate ceiling.

At Oudenarde, the Hotel de Ville, resembling in certain features the one at Louvain, is probably the most ornate in Belgium. It was erected in 1525 under the reign of Charles V. The chief interest within is a fine oak chimney-piece in the council chamber. At the summit of the tower is an imperial crown and bronze figure, while on the chimney are emblazoned the arms of the town and of Austria.

The Cathedral of Tournay is one of the most interesting churches of the province. More than four hundred feet internal length and covering an area of sixty-two thousand five hundred feet, it is exemplary of the best architecture of the eleventh, twelfth and fourteenth centuries.

The following notes are taken from the article by John A. Randolph, who wrote for the *Builder* his trip of 1,200 miles in Belgium a short time before the country was thrown into its struggle for existence. The first place after Calais, the starting point, was Comines. At a short distance from the station is the Grand Place, where the large central-towered church and the belfry stand, with the public garden, to the north of the church. The belfry is very quaint and picturesque, with Flemish ornamentation on the stone tower. Near the station is a large modern Gothic church, in bright yellow brick, with the usual blue limestone tracery, west doorway, buttress weatherings, etc.; but, excellent on the whole as the church is, the flat east end and the transepts are spoiled by clumsy rose-windows, with tubular-boiler pattern. The proportions of the church are very fine, but the building looks quite out of harmony with the poor surroundings and much too large for its Belgian community, the church on the Place serving the French members of the population.

Soon after arrival at Ypres, a convenient set of trains enabled us to visit both Vlamertinghe and Poperinghe, the first-named with its impressive brick tower with blind tracery of typical West Flanders style under the belfry windows. The church is close to the station and the railway line, and was thus "discovered" by us on our previous visit to Belgium, when journeying from Ypres to Hazebrouck and Calais.

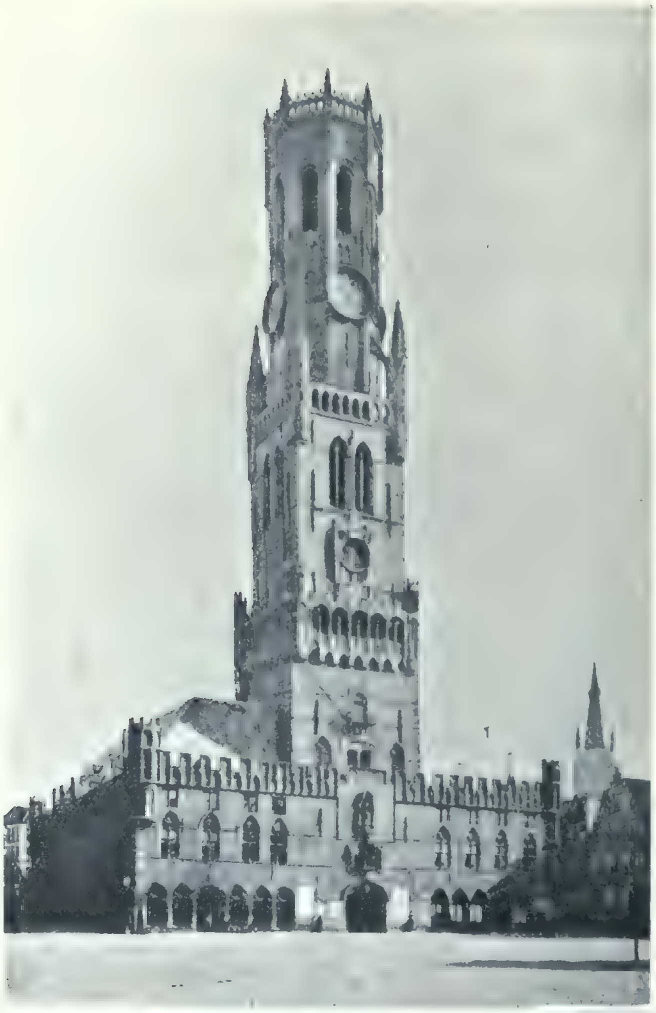
Of Poperinghe some idea of the architectural treasures may be gained from the train; on the northern side of the line the town lies, and its two huge Gothic churches and the graceful steeple of a third large one near at hand come as a surprise, for the town is poor and small and straggly. St. John's, the pilgrimage church, is quite spoiled interiorly owing to being plastered over and fitted up in the worst Renaissance style; but its proportions are striking. At Ypres a lofty spire has been added to the tower of St. Jacques Church, and it is now the tallest steeple in the town. From Ypres to Courtrai brought us en route to Wervicq, with a church, on a great scale, of the fourteenth century, the spire having been added of recent years. Menin Church is disappointing and unattractive.

DINING ROOM IN HOTEL AT BRUSSELS.

SALON IN HOTEL AT BRUSSELS.

Outside Courtrai—about five minutes by train—is Harlebeke, one of the particular spots planned to be visited on our journey. The belfry stands in a wide street parallel with the railway, but at a few minutes' walk, and can be fitfully seen from the passing train. The structure might almost have been transplanted from some Rhenish town. Alongside the Romanesque belfry, to which part of the original church is attached, is a large Renaissance church, completely dwarfing the ancient monument at its side. Its front is fairly ornate and is the best part of the building, but the church is very incongruous where it is.

From Harlebeke a short run brought us to Waereghem, where the early central tower is crowned by a splendid spire. The western end



TOWN HALL AT BRUGES.

of the nave has been added in the last century—about the fifties possibly—with a pretentious west front awaiting the raising of the nave roof behind, when funds allow. Thielt, not far away, was our berth for the night. Its old belfry, with Renaissance arcaded structure round three of its sides, standing isolated in a corner of the Grand Place, is not as well known as it deserves to be, and its carillon is a delight to the ear. The curfew is still rung from the tower every night.

Next morning Deynze, with its fine Gothic church by the riverside, with a small central octagonal tower and spire, was visited. It has been well restored of late and will well repay a visit. In the outskirts of the town is "Petegem-lez-Deynze" (to distinguish it from the one near Audenarde), whose church has an octagonal Romanesque central tower, with high roof rather than a spire, but the church is Renaissance. The ensemble, however, is pleasing, and the situation is picturesque. On the way to Audenarde, later in the day, the curiously-roofed church of Anseghem attracted our attention, the choir and nave roofs each of different height, sloping away from the small central tower, with its relatively high spire.

At a little distance northeast of Audenarde is Sottegem, which, according to the opinion of the inhabitants, has "nothing to see." Last time we took their word as gospel, but found, too late, that it had something—a well-proportioned Gothic church with transepts and nave aisles and apsidal chapels, and a quaint Renaissance steeple at the west end astride the roof. In that steeple is a carillon picturesque enough to please the most fastidious. That much we found to be the case on this trip, as the place was on our list of visitanda, as also Dunderleeuw, which we found had been rebuilt, except the fine west tower and spire; and fortunately it has little trace of the "school" type about it, the "school" being one which is responsible for many so-called restorations and much new building and polychrome work of its own particular kind up and down the country, the details of which, being so continuously thrust upon one's gaze, soon begin to pall.

Soon after we arrived at Ath—an old straggly town with a gigantic twelfth-century west tower to a modern Renaissance church built on the site of an older one. That and a ruined castle-keep in the town's outskirts are all there is to see of any importance archæologically, though there

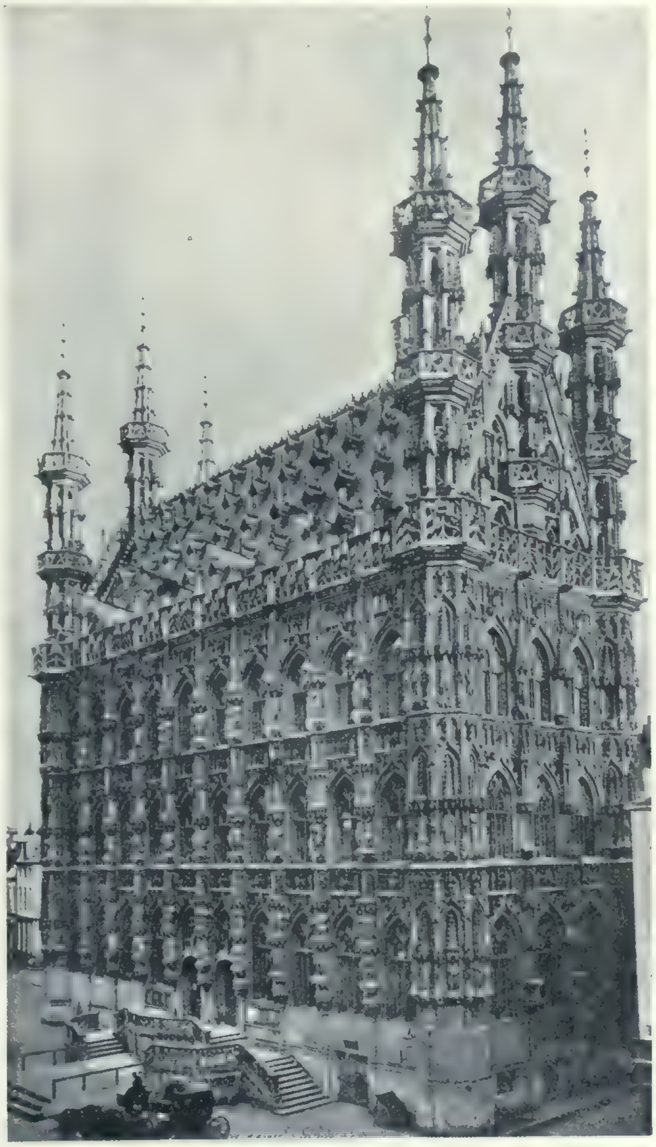
NEW LYRIC THEATRE AT ANTWERP

are a few picturesque old houses, and the town hall, a simple affair, has an interesting apartment. There is, too, a convent chapel with a graceful little steeple. We, however, made the place our headquarters for two nights, with the object of renewing our acquaintance with the noble Renaissance Church of Leuze, whose transepts have two rows of windows, and working our way thence to Blaton and Peruwelz. Of these two Blaton is pre-eminently the more interesting, and its situation on the banks of a canal is one of great charm, but a terrible road with terrible "pavements" led up to it from the station. The steeple is of singular elegance and very lofty. It is of very early date and of a greyish-brown stone. The little staircase turret adds charm to the building. The approach to the church is by a path on the canal bank and through a common door in a wall dividing the path from the churchyard. Our return to Ath was via Beloeil, with its beautiful and historic park, and the rest of the scenery, partly along well-wooded canal banks, was what one would expect in a part of Belgium away from the flat lands of Flanders.

St. Ghislain, near Mons, via Chievres, has a pleasing little west front of the fourteenth-century period, the wall-space of which is relieved by string courses instead of buttresses, panelwork, and niches, and the elegant steeple gains much in picturesqueness from the little stair-turret on one side arising out of the facade. The west-window tracery is good and simple, and, on the whole, the church, which stands in a corner of the Grand Place, has a certain attraction of its own which the bolder and more ornate town churches do not possess.

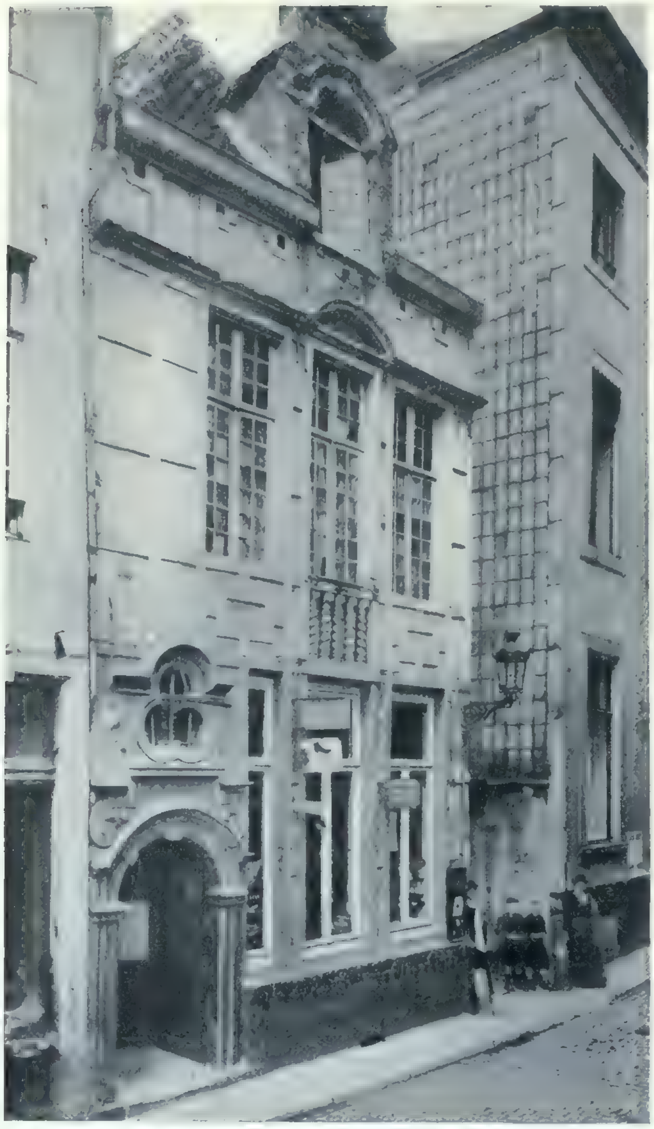
Coming northwards, we passed Soignies, one of the oldest abbey churches of Belgium and an interesting structure owing to its rugged simplicity and its striking broad and low central and west-end towers with high roofs, the building being erected of huge masses of greyish stone of the district, our next halt was Braine-le-Comte, in the church of which may be seen a St. Christopher of gigantic proportions, excepting for the thickness of the limbs, for he looks like a man in the last stages of starvation; the Divine Infant on his shoulder is as much exaggerated in the reverse sense, being represented almost as a dwarf. The Renaissance screen and organ-loft, combined, in the church is of black-and-purple marble, with panels of Scriptural subjects in high relief, the bays of the screen and the gates having bronze colonnettes, the whole being one of unusual beauty and refinement.

Thence we went to Hal for the night, making for Nivelles next day. Notre Dame at Hal is one of the most interesting churches in Belgium, interiorly. The Church of Nivelles, with its extraordinary and lofty west tower and spire rising from a straight front and flanked at a few feet away with elegant turrets, and alongside which is the beautiful Romanesque cloister, though visited several times, comes as a perennial source of pleasure to one in search of architectural gems. The situation of the great church is one of much beauty and picturesqueness, as the town is very hilly and the valley and ramparts round are well wooded.



TOWN HALL OF LOUVAIN.

Fleurus, itself historical, possesses a small church, low and simple, the nave having been altered in Renaissance times, but the choir is Gothic. Gembloux did not detain us, so we caught an early train via Tirlemont, with the two big churches towering above the town, to Louvain for the night; but, arriving about five in the afternoon, we had ample time for seeing the town hall, the restoration of the stonework of which was to have been finished last year, to be followed by the renovation of the roof, and the churches, especially St. Peter's, whose west towers do not rise above the main roof of the



HOUSE AT BRUSSELS.

nave, though the huge northwest one has a picturesque superstructure of modest dimensions replacing the lofty spire of the Middle Ages which succumbed to lightning. In the town hall is a model of the intended complete west front, with two lofty towers having octagonal upper stages open, and each surmounted by a pierced parapet with pinnacles at the angles. Quite recently a sum of several million francs has been voted for the completion of this great church according to the model and for very necessary repairs to the elaborate fourteenth-century panelling and nichework, and the porches, especially the half-finished south one, that faces the town hall, and which till recently was built up to on both sides by modern houses backing on to the aisle chapels of nave and choir. When the restoration and completion of the church have been effected that structure will be one of the finest in Europe. The chime comes from Parc Abbey, at Heverle, outside the town.

St. Joseph's Church, near the Place du Peuple, is another church on a big scale and with an unfinished steeple, less ornate than its fellows in the town, but notable for its facade being in stone, and the body of the church in brick, of fine proportions, although crudely decorated inside. The arches of its three west doors and of the west window are severely cracked, the foundations having given considerably; so it is unlikely that anything beyond a slate-covered spire will ever complete the west front of that church.

St. Gertrude's—away from the main part of the town—is, apart from its elegant detail and graceful spire, a church to be seen for its magnificent stalls; and the visitor to Louvain should not fail to take the tram to Heverle to see the celebrated Abbaye du Parc, the present buildings of which are Renaissance; but the monastery dates from pre-Gothic times, and a blocked-up Romanesque door in the wall of the church is all that remains of the original structure. Its situation is very fine and its library and painted ceilings are remarkable.

Next morning we trained to Landen again, but this time to change into a *train leger* for Huy, through exquisite scenery and passing two old chateaux and two Romanesque churches, with exterior arcading to the choir and side-chapels, and a very picturesque old farm just outside Statte, where the train halted for forty-five minutes before restarting for Huy (Sud), five minutes' run, the vantage-point for visiting the church. The road to the great church, from the station of Huy (Sud), is by a narrow winding street, and the alleged five minutes' walk is nearer ten. The great east end, with its lofty side-chapels and rather "thin" slender Gothic towers flanking the chancel close to the marvellous apse, and the elegant "Bethlehem porch," with carving in high relief over its central arch, that gives access to the footway alongside the south aisle, suddenly meet one's gaze. The effect is striking, but further surprise is in store for the visitor. Making his way to the west door of the aisle, on one side towers above him the rock on which the huge citadel is built, and on the other a gigantic mass of stone, with immense traceried windows, but so high is the aisle wall that the nave is invisible from below.

VILLA AT SPA.

VILLA AT SPA.

Close by the west end of the aisle a massive tower, very plain in its lower stages, except for the fine Rondia, as the deeply-recessed rose-window is locally called, projects into a small open space by the side of the river. Entering the church at this end, one is overwhelmed by the sight. The structure is a giant among the giants of Belgium, such as St. Peter's, at Louvain; St. Martin's, at Alost; and St. Bavon's, at Ghent, to name only a few; but it surpasses them all. The whole length of the vaulting is decorated with late fifteenth-century foliage and flowers of various colors, with striking effect. The immense columns, supporting richly moulded arches, are of a grey stone, as also the blind tracery in relief in most of the bays of the aisles, and on the great west wall above the Rondia right up to the vault; in some of the bays it intersects Romanesque arcading that appears here and there under the windows.

The twin-light traceried windows of the apse are about 90 ft. long and add greatly to the effect of height. The high altar reredos is a beautiful representation of the "Last Supper," in bronze heavily gilt, with a rich Romanesque canopy of the same material; the Lady altar in the north transept is also an architectural gem, and the figures in the panels (richly colored and with gilding with a metallic sheen, such as is found on mediæval statues in Germany), are of the utmost refinement. Underneath the church is a Romanesque crypt of great beauty. The church was first built in the second century and, after almost entire destruction in 384, was rebuilt in the sixth, and restored between 1376 and 1536.

Once more we found ourselves northward-bound by the same line as far as Landen, and thence, via St. Trond (visited a good many years ago and not so interesting architecturally as Tirlemont), to Hasselt, passing, just before reaching our day's destination, the village of Cortenbosch, with its large church that boasts of perhaps the most elegant and most daring Renaissance spire in Belgium. The principal church of Hasselt is of fine proportions, with picturesque grouping of side-chapels to the choir, and the sacristy, on the south side, is curiously hemmed in between, with a neat little turret. The west tower is Romanesque in its lower stages, with shallow wide arcading. As is so frequently the case, the spire is Renaissance. In the interior the restoration work has been unusually successful, and the main coloring of the walls is cream; the polychrome pattern is so well kept in hand that it is almost unnoticeable, and the leaves of the fifteenth-century capitals of the beautifully-proportioned columns are brightly gilt, giving additional lightness to the *ensemble.* It was a decided relief to find a polychromed church that was not overdone with gaudy coloring, however well meant.

At Diest our hotel faced the big Gothic Church of St. Sulpice. That church is remarkable in many ways. Its ornate west tower, with big recessed porch and fine window over, is unfinished and only rises to the height of the nave roof. It and the front generally is of white stone, but the rest of the church is of red stone. The tracery of the nave and aisle windows is very fine and varied, the transepts of noble pro-

HOUSE AT SCHAERBEEK, NEAR BRUSSELS.

CORNER TREATMENT, PALAIS DE JUSTICE, ANTWERP.

portions, and the choir, seen externally with its radiating chapels (the eastern one of which is unfinished, and the remains of an early church are on its site), is magnificent and on such a scale that the flying buttresses are double-arched. The walk from the charmingly-situated station to the Grand Place, where the church is, is tedious and winding, but amply compensates one, as part of the distance is between well-timbered ramparts and part of the side of a most picturesque canal.

At Moll the principal church is a lofty and imposing Gothic building, with a plain, soaring straight-lined tower of red stone striped with white—a great change from the fourteenth-century ornate west towers of white stone farther south. Moll is emphatically a place for the architect in search of Dutch influence in ecclesiastical architecture, and so is Turnhout, which we next saw—after passing Gheel, with its two noble Gothic churches—to the north of Herenthals, the church having no nave windows, being lighted from the aisles—an apology for buttresses at the base of the tower, lofty transepts, with traceried windows of splendid length and proportions, high square transept aisles, and a curious arrangement of radiating choir chapels, alternately apsed and straight-ended, the straight-ended ones not projecting so far, but having gables with large traceried windows in them. The tower is devoid of any arcading or windows, panelling or string courses, right up to its belfry light; the west doorway, under a pediment, is singularly small, and the buttresses on either side of it are about 3 ft. higher, topmost weathering included, not reaching even to the eaves of the aisle roofs. The aisle buttresses are mere vertical bands of flimsy masonry.

We next took Lierre and examined the immense Gothic Church of St. Gommaere. The church is noted for its superb Late Gothic screen, one of the few churches of the country to possess one in that elaborate work of the period.

After Lierre we lay up for the night in a quiet village at the foot of a hill, which gives its name to the locality—Heyst-op-den-Berg—but at a good mile or more from the station, though that was a trifle by the steam-tram, or *vicinal*, as it is locally called, which had a halting-place at two doors off our inn. Before dark we climbed the hill, which has an extensive view over the surrounding plains, the interesting church, with its graceful steeple, well-proportioned and relatively lofty transepts, and radiating choir chapels, being on the plateau there, with houses lining the sides of the curved streets that surrounded the church.

An early start was necessary in the morning, as the steam-tram did not meet every train, and we thus avoided a three-hour wait later on in the day by going to Antwerp direct and making for Tormonde and Alost via Boom and Puers (with its large church with Gothic transepts and choir and Renaissance tower, nave, and aisles, near the west end of the town), instead of avoiding Antwerp and taking a short cut, as we had intended to do.

At Tormonde, on our visit five years ago, scaffolding was up at the north transept of the Church of Notre Dame, the parish church with a graceful octagonal tower. As we had discovered on our way to it then that the beautiful seventeenth-century stone gable on one side of the town hall tower had been demolished and a stiff modern Gothic one erected in its place, in

ENTRANCE TO PALAIS DE JUSTICE, ANTWERP.

the style of two smaller ones on the other side of the tower, we were sorely afraid some great change was contemplated. Our fears were only too well justified. This time we found the solid low parapet at the top of the tower had been replaced by a pierced one, with tiny pinnacles at the eight angles and a lofty spire put on, instead of the low roof formerly there. The whole effect is lamentable, the spire being at least twenty feet too high for proportion with the church, which is not a long or over lofty one. Seen from outside the town the spire is absolutely grotesque in its exaggeration. During the day we visited Moerbeke. They are funny people at Moerbeke; they sell postcards of the place certainly, but, though views of an ultra-modern factory, and one or two modern villas, and of canal scenes (which might be anywhere) can be had almost for nothing—twelve for fivepence—not one of the church is obtainable, the most interesting thing in the place—a well-proportioned almost "Hallekirche," with tracery in its apses and choir aisle east gables, but not elsewhere, and its central octagonal tower, but no transepts.

On Bruges we need not dwell, though there is much done during the last five years in the way of restoration work, including the at present unfinished shallow gable on the hospital facade facing the new (and heavy) front of Notre Dame. The gable in question has been erected in blue limestone, and the carving in the niches of the old has been taken away—temporarily, we are told—the gable being crowned by a disproportionate finial. The Renaissance aisle windows of St. Jacques will disappear shortly, as the brickwork round some of them has come out and exposed some rich brick mouldings still *in situ*.

We should mention the Gruuthuys restorations and the consequent opening to the public of the ground at the rear, with its charming houselets adjacent to the quaint little conceit locally known as the Pont St. Boniface—a construction that has, however, come under the ridicule of some of the professors at the Ghent School of St. Luke, though we confess to a liking of the new old bridge (where there was none before). The big yellow-washed brick front of eighteenth-century date on the Dijver alongside the entrance to the Gruuthuys, which is clearly shown in Marc Gheeraert's map of Bruges as belonging to the main structure, has had some bricks taken out here and there at the sides of the modern window-sashes, and this has revealed brick mouldings of the fourteenth century which graced that part of the Palace, and consequently we may look forward, at no distant date, to the modern brick-stopping being taken away and the completion of the restoration of the Palace as far as possible according to Gheeraert's view.

While at Bruges we retraced our steps to Bassevelde, near Eecloo, which we had passed on our way to Bruges from Moerbeke, and the church is of noble proportions, with octagonal central steeple, and on the south transept gable a three-arched thirteenth-century arcading over the window, the north one having a four-arched one. Under the north transept window is a rude trilobed doorway, blocked up, of the earliest period of Gothic architecture. Indeed, it might almost be Romanesque. Next day we trained to Cortemarck, to view the typical Flemish steeple, between Thourout and Roulers. The church, however, is an ingenious construction in the fifteenth-century style (with wretched cast-iron tracery in the windows), in brick, with brick moulding to the arches and brick ribs in the vaulting, but the intervening material is apparently lath and plaster! The situation is picturesque.

HOTEL DES POSTES AT OSTEND.

We left Bruges a few days afterwards and made for Ypres via Cortermarck, and among the interesting churches after Cortemarck special mention should be made of Boesinghe, with its lofty tower and crocketed spire of stone and its beautiful church. Roulers was our next objective the following morning. On arrival there we relieved ourselves temporarily of our luggage and took the next train to Rumbeke, of which Baedeker makes special mention, not without cause, for its steeple is very fine and lofty, and the church, though hardly so fine as we expected, has some old work of a previous structure in its outer walls. Near Rumbeke is the beautiful mediæval beturreted chateau of the Count of Limburg-Stirum, and Rumbeke itself boasts of an interesting old Gothic house near the church.

That night was the last of our hotel nights in Belgium for the trip, as next morning we started for Ghent.

Note.—It is scarcely credible that this nation which teemed with towns of such unusual interest should now be a country of ruins and poverty destined to suffer further annihilation.

Solving the Narrow City Lot Problem

J. J. LAFERME

ARCHITECTS and owners are frequently faced with the problem of a lot in a desirable locality, but apparently too narrow to warrant a good residence being erected thereon. This fact has had to be met more frequently in Europe and the States than in Canada, but in the larger Canadian cities the problem is beginning to present itself.

In the particular residence illustrated herewith, the solution was rendered more difficult by the fact that the lot is only twenty feet wide with houses built right on the line at either side, and straight back without any possibility of side light for the proposed residence.

The property was valuable and the locality enhanced by a spacious and beautiful garden on the opposite side of the street, upon which buildings would never be erected. The house is located on Wood avenue, Montreal, and faces the gardens of the large seminary which extends from Wood avenue nearly to Guy street and from the Mountain to Sherbrooke street.

PARLOR.

The writer, who is also the owner of the residence, studied and practised architecture, although in a different walk of life at the present time, and gave the matter considerable study, handing his sketches to Joseph Wechselberger, architect, who further studied the subject, bringing the plans to a head, the building being erected under his finished plans, specifications and surveillance.

Having no side windows and the point at issue being to get good light in every room, which is seldom found in narrow city lots, it was decided to furnish centre illumination, then depend on front and rear lighting. Consequently the centre of the house was designed as a large living room with top light, 24 ft. 6 in. long by 19 ft. wide, namely, the distance between the party walls. It is illuminated by a 12 x 14 ft. art glass ceiling light covered by a ridged sky-light, and, needless to say, it is as bright as day in the living room. In fact, canvass on pulleys has had to be stretched above the ceiling light to diffuse the strong glow on sunny days.

To overcome the winter snows, coils of hot water from the heating system have been placed around the space between the skylight and ceiling light. Last winter, although a severe one, the snow melted on the skylight as fast as it fell. This ceiling also permits of indirect lighting through the art glass, as lights are placed in the space above.

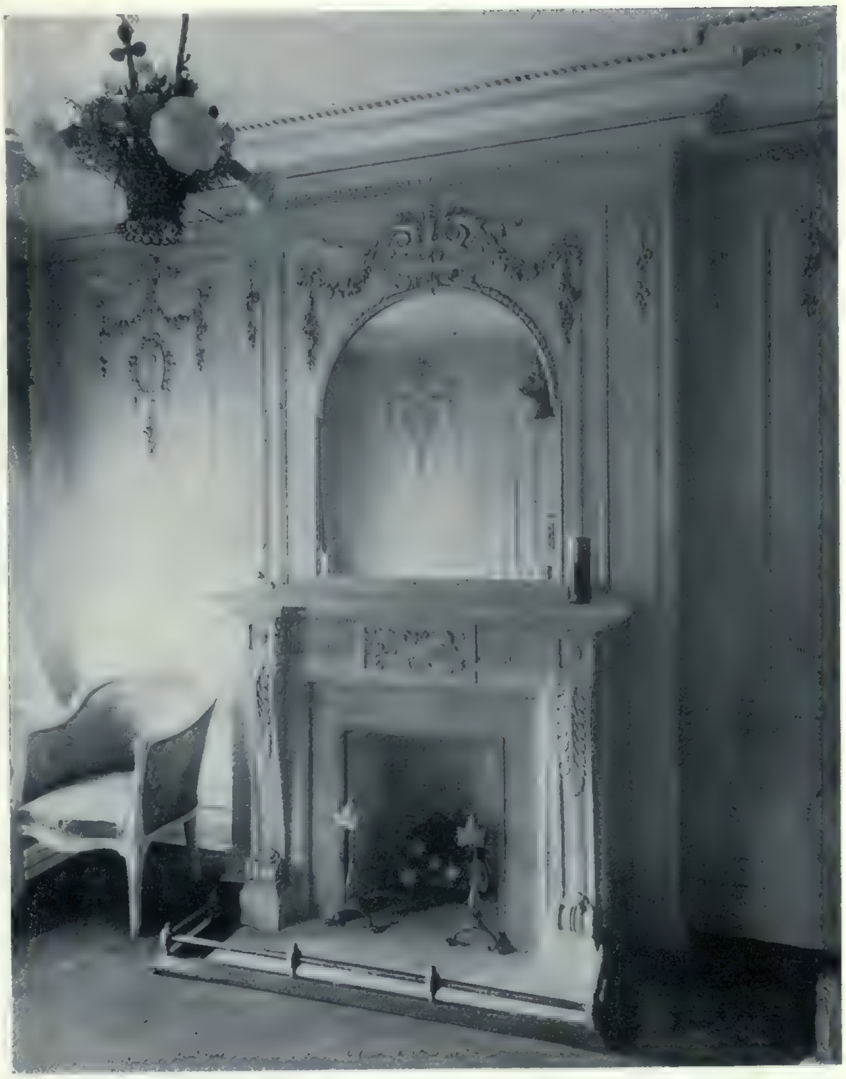
From the illustration of this liv-

MANTLEPIECE IN LIVING ROOM.

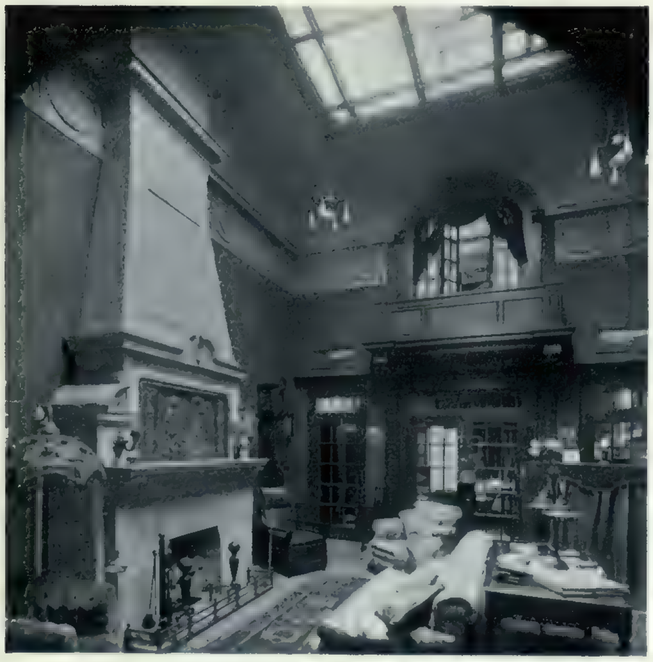
ing-room with its high fireplace and silk covered walls, the impression is certainly not that of a house built on a twenty foot lot. On the entrance floor, towards the front, is an artistic Louis XVI reception room with walls and fireplace decorated in relief of this period. The entrance and stair hall are done in Caen stone imitation, a lavatory and cloak room being provided. The woodwork is painted white and from the stair hall large double glazed doors lead into the reception room on one side and the living room on the other.

Up one flight of gracefully carved stairs with a velvet hand rope, one reaches a landing with an arched balcony overlooking the living room and the main bedroom with its tiled bathroom, clothes presses and balcony overlooking the seminary gardens. From the same landing, one more flight of easy stairs leads to the top floor with its two large bedrooms and tiled bathroom between.

The front bedroom is the entire width of the lot and has a balcony equally as long to which access is gained by a dormer window. The bathroom and stair hall in the centre are lit by a skylight. The rear bedroom has windows and a glazed door giving access to the roof over the living room and balance of the building, which is lower by one story than the front portion of the residence. This roof is very useful for airing and drying clothing.



MANTLEPIECE IN PARLOR.

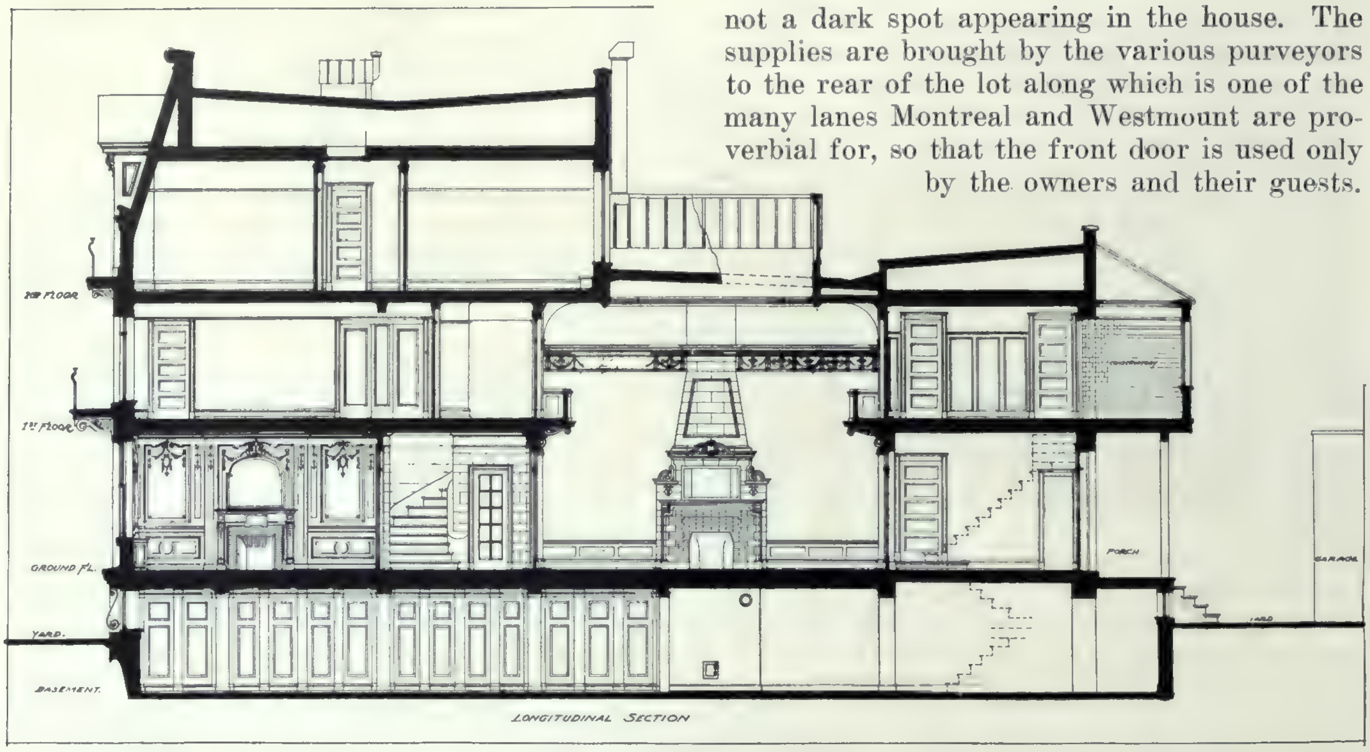


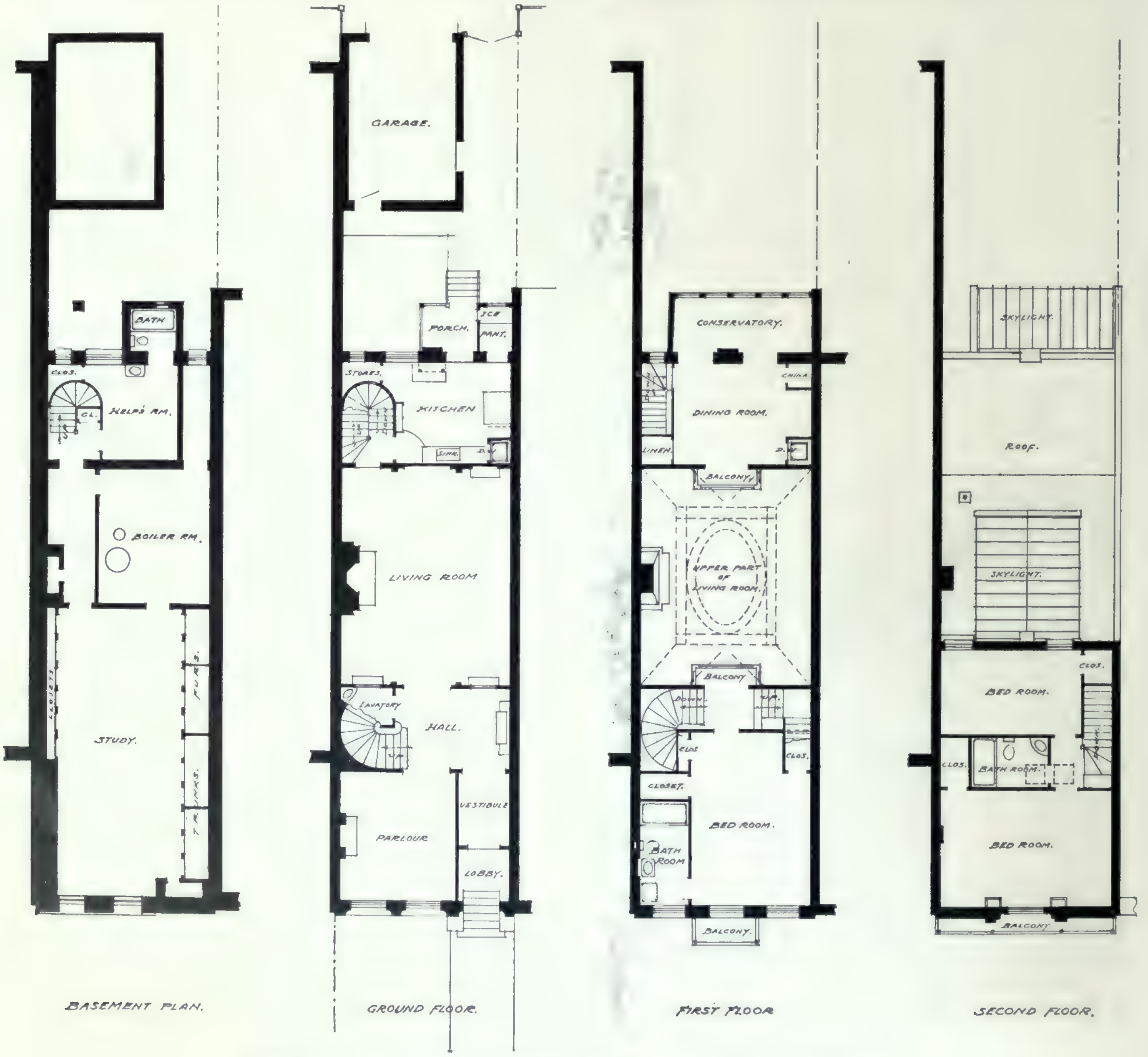
LIVING ROOM.

The building beyond the living room consists of a kitchen on the living room floor, stair hall leading up to dining room, which is one flight up and has a balcony with glazed doors overlooking the living room. Service is from a dumb-waiter, as the kitchen is immediately below. Beyond the dining room and opening off same is a conservatory of which the floors, and such of the walls that are not glazed openings, are tiled.

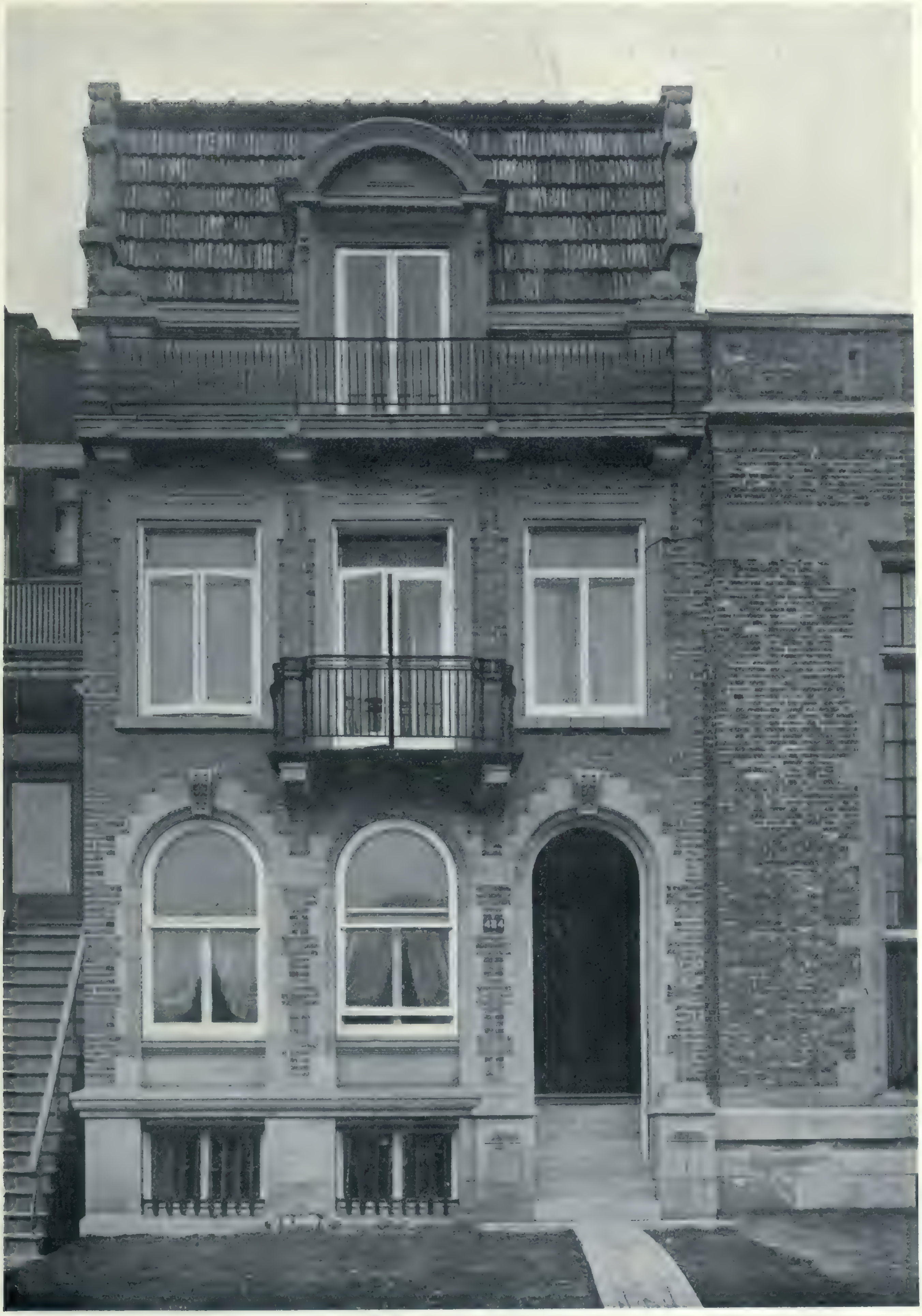
The dining room being one floor up, is provided with a pantry, also hot and cold running water in a sink closeted off to match the dumbwaiter enclosure, offering additional comfort. The dining room could have been built "en suite" to the living room, but as a garage was wanted on the lot, it would have been too tight a fit, besides the novelty of a dining room with conservatory one floor up, overlooking the living room and the garage, have proven an additional attraction. The basement, which is five feet above the ground, is occupied by a spacious servants' room with its own bathroom; furnace, laundry room, coal room, and chute from the rear. To the front is a large study, on the side walls of which have been partitioned off trunk rooms and cupboards.

The problem has been particularly well solved, not a dark spot appearing in the house. The supplies are brought by the various purveyors to the rear of the lot along which is one of the many lanes Montreal and Westmount are proverbial for, so that the front door is used only by the owners and their guests.





SECTION AND PLANS OF HOUSE ON WOOD AVENUE, MONTREAL.



HOUSE ON WOOD AVENUE, MONTREAL.

JOSEPH WECHSELGERGER, ARCHITECT.

The Ontario Association of Architects

THE members assembled for the twenty-fifth annual convention on Wednesday, September 16th, 1914, in the rooms of the Association at 96 King street west, Toronto. Prior to the convention a meeting of the Council was held, and after the disposition of some items of business, the convention was opened by an address from the president, C. H. Acton Bond, which dealt with the various subjects of interest to the profession, in particular the desirability of the members using Canadian material and workmanship wherever possible.

Reports of officers and committees, and also of chapters, were then received and adopted. A report was then read by the organizer of the Architects' Rifle Association, R. K. Sheppard, which naturally was of the greatest possible interest to the Association at the present time.

During this meeting a serious discussion ensued upon the subject of preparation of plans by engineering firms to the detriment of the architectural profession. At the conclusion of the first session, which was of the most interesting character throughout, the members adjourned to the dining room of the Engineers Club in the same building, where they enjoyed a most delightful luncheon.

After luncheon the members motored around the city, and made their first stop at Casa Loma, where, under the guidance of E. J. Lennox, its architect, they thoroughly inspected this very notable residence. Since the knowledge of the general public is largely confined to the outside of Casa Loma, it is interesting to record here the appreciation manifested by the members of the Association over the excellent detail upon the interior. The next visit was to the University, where the members were conducted through the Hart Building by Henry Sproatt, the architect. Here also the members voiced their appreciation for this fine structure in most generous terms.

The second session was opened the following morning in the rooms of the Association at 11.15 by the president. An interesting report of the Editing and Publishing Committee was presented, after which it was decided to ask Mr. Sheppard to continue the editing of the Journal, Mr. Langton kindly offering to act in the capacity of consulting editor.

The subject of the standard of design to be required at the hand of applicants for admission to the profession, which had been alluded to the day before, came up for further discussion. The debate was probably the most considerable of the afternoon, and was contributed to by a large number of those present. Upon the subject of standard size for catalogues, the members were in agreement that such an end should be brought about, if possible. One or two other points came up for discussion, including that of reading important papers at the convention, and the consensus of opinion was that it might be well to encourage a revival of the reading of papers upon certain subjects by those particularly informed upon such matter.

At the close of the morning session, the members found a string of motor cars awaiting them at King street, to convey them to the Scarborough Golf and Country Club. They keenly enjoyed this opportunity to get away from the city streets, out into the country, and as the day was one "snatched from heaven," when they reached the splendid capacious club house they were as ready as a lot of youngsters to enjoy the luncheon and the work following it.

At the third session of the convention in the afternoon, the subject of training of students arose. This was a grave and serious discussion, more particularly with the part played by the University. The consensus of view appeared to be that while there was considerable improvement yet to be made, the University in fairness should be credited with the excellent results already accomplished. Several of the delegates took pains to emphasize the necessity upon the part of the profession to impress upon the minds of students the necessity for a University course.

It was urged by Mr. Burke that enlarged photographs of past presidents should be obtained for the purpose of the Association, the expense of those having died to be borne by the Association. This suggestion was heartily welcomed, and left to the library and rooms committee to deal with the matter. Some discussion took place upon the matter of the disputes between architects and clients, resulting in a resolution for the formation of a committee to consider any such dispute.

At the close of the session, an election was held for new members to take the place of retiring ones belonging to the council. The retiring members, Messrs. Meredith, Moore and Power, were replaced by those newly elected, Messrs. Sheppard, Wickson and Watt. Later on the new council met together and elected the following officers for the ensuing year: President, C. H. Acton Bond, Toronto; first vice-president, L. Fennings Taylor, Ottawa; second vice-president, Chas. Langley, Toronto; treasurer, J. P. Hynes, Toronto; registrar, F. E.

Belfry, Toronto; secretary, R. B. Wolsey, Toronto. Council—W. W. Stewart, Hamilton; W. R. Gregg, Toronto; John M. Watt, London; A. Frank Wickson, Toronto; Ralph K. Sheppard, Toronto. Representative for Canadian National Exhibition, Edmund Burke; Art Museum, A. Frank Wickson and W. Ford Howland; College of Arts, A. H. Gregg and C. H. Acton Bond.

The luncheon on the second day of the convention of the Association of Architects was held at the club house of the Scarborough Golf and Country Club, an architectural accomplishment of the firm of Langley & Howland. The conditions were ideal, in that the weather was superb, the landscape to be seen through the windows of the dining room, beautiful in form and color, and the meal itself most excellent.

As announced by the president during the luncheon, Literature was represented by Augustus Bridle, president of the Arts and Letters Club; Music by Dr. Vogt; Painting by C. W. Jeffreys, President of the Ontario Society of Artists; Sculpture by Walter Aylward; and the engineering profession by Col. Van Nostrand, and the legal profession by A. Monro Grier, K.C. The press was represented by F. Reed, and, in addition, there were present as guests A. M. Grantham and F. C. Henderson. At the conclusion of the luncheon, the president proposed the toast to the King, and after that was most cordially drunk the National Anthem was sung, Dr. Vogt kindly accompanying on the piano.

The toast to the Empire was then proposed by the president and responded to by A. Monro Grier with telling effect as follows:

"Mr. President and Gentlemen,—Before proceeding to the toast which you have honored me with, I should like to say that I am quite sure that those who are associated with me as fellow guests will cordially agree with me that the Association of Architects are very sincerely to be congratulated upon their arrangements for this luncheon to-day. I think that, speaking in the company of architects, it is not wholly unbecoming on the part of a layman to voice his very sincere appreciation of being for the time housed is so delightful a structure as this present one. I have been delighted with such parts of it as I have already seen and I hope I shall have the pleasure of seeing the remainder of it soon. Speaking particularly of this room* it is, I think, a very happy circumstance indeed that we find ourselves meeting in a room upon the walls of which are emblazoned not only something which indicates the crest of the particular club, but which reminds one of something far greater—it is hard to think of anything else so great upon the material earth—it reminds one of the British lion itself.

"I approach this toast of the Empire with a feeling of responsibility, because the occasion is good, the day is splendid, the company is all that could be desired, but I have this feeling very seriously at the bottom of my heart that really at the present time there is nothing that could by any possibility heighten the splendor of the toast itself. More than ever am I impressed with the utterance of Lord Milner when he said 'When men cry hurrah at the mention of the British Empire, I for my part feel inclined to go into the corner and pray.' To pray because of the extraordinary responsibilities that it carries. So to-day I will, with your permission, depart from any allusion to the sense of honor and pride which I feel in speaking to you, those things must be taken as understood, and with your good permission I shall not indulge in anything in the nature of badinage because this particular toast seems to me to call for utterances befitting the circumstances under which the Empire at present finds itself, and that is a state of war.

"Gentlemen, we have always felt proud of the British Empire, but I believe that I voice not my own opinions only, but that of every subject of the Empire, man, woman or child, when I say that we have been profoundly prouder and more gratified since the 4th of August, on which day we said to a Power hitherto thought invincible, 'Thou shalt not strike a small defenceless nation.'

"We go about our several ways; we discharge as best we can the duties that lie in our paths; but overhead all the time there is this cloud of war, and to my way of thinking there is but one set of men who are splendidly discharging the highest duty, and those are the men who at this present moment are on the Continent of Europe, perfectly content if necessary to lose their lives in the defence not alone of the British Empire, but, as I verily believe, of the freedom of mankind itself. Those are the men of whom we are all thinking to-day, and I suggest that constantly we say to ourselves, 'Thank God, I belong to the British Empire.' Not as we generally do, principally by reason of its large possessions and the way in which it administers them: those things are fine in themselves. But to-day mainly, and to an extent to dwarf every other consideration, because of the fact that this Empire which loves peace as probably no country in the history of the world has loved peace, this Empire has said, 'there are certain things which, so far as we are concerned, shall, by the help of God, never happen, and if necessary we will go to war to see that what we will is carried out.' That is our situation to-day, and the beauty of that situation is that we can claim for ourselves the right and the intention to do the right thing without saying a harsh word of anyone else. We have no unkindly feeling towards any other nation. We have only this high resolve, that so far as we are concerned the weak of the earth shall be protected, treaties shall not be regarded as mere scraps of paper, nor shall the bayonet rule throughout the world so long as there exists that thing known as the British Empire.

---

*The decorations of the room included lions rampant.

"When this war broke out I was in London, England, and since then I have traversed the Atlantic Ocean; and in London and on the Atlantic Ocean and in Toronto and in Niagara Falls and elsewhere I have heard the same song sung, the chant 'Rule Britannia' has sounded in my ears in every place. There has been not a vestige of difference anywhere. A man in Ontario is part of the soil of England, and the man in Essex or Devon or Cornwall is part of the soil of Ontario. The Empire is one, one fine splendid thing, splendid in the past, and to-day far more splendid than it has ever been. Not by reason of any arrogance, not by reason of claiming that it can defeat other countries; for nothing of that kind, but for this sheer thing that is says 'our men, our women, our children, our all if necessary shall be sacrificed for the good of the world and for the freedom of mankind.' This is the condition to-day; we are in a condition of war, and I very much mistake the architects of the Province of Ontario, as I mistake any dweller in the Dominion of Canada if I am not right in supposing that, if duty calls, one and all will cheerfully go over to the Continent of Europe and lay down their lives.

"Therefore let us take heart; let us believe that such horrors, which have evolved amongst other evils the destruction of beautiful things architectural; let us believe that these horrors which have involved inhuman and atrocious acts, are not the part and portion of any civilized nation, but that they are rather the outcome of a tyranny, of a military power, and when I use the word I do not of course mean military as we use it in our healthier and saner view of things, and let us say to ourselves that whilst this war lasts we are willing to do our duty wherever it may be and when the end comes we shall do our part to see that, whatever else is neglected in the terms of peace, there shall be two things quite certain, that those who have been arrogant shall be stripped of their power so that no longer they can affront and affright the rest of mankind, and that men throughout the Continent of Europe and elsewhere shall feel that they are always at liberty to serve their God and to do their duty without any fear of tyranny above them.

"Gentlemen, you may think that perhaps I speak intensely upon this subject. I can speak in no other way. We are at war. And we ourselves, like all good members of the British Empire, must be prepared to do our duty, not from hatred of any other nation, not from any servile, mean or dishonorable cause, but simply because we are proud that we belong to a nation whose cause is so absolutely just that there is no possibility of gainsaying it. What is the thought which should fill our minds at the present time? I am reminded, as I speak, of two or three lines which I shall conclude with, changing the last line somewhat, to meet the occasion. They seem to me to aptly illustrate the spirit which should animate us all:

" 'Strike 'till the last dread foe expires,
Strike for your altars and your fires,
Strike for the gravestones of your sires,
England and rights of man.' "

The president then proposed the toast to the Guests, which was replied to by Mr. Bridle, Dr. Vogt and Col. Van Nostrand. Mr. Bridle's speech, which furnished in parts a delightful example of his sardonic humor, consisted of exceedingly interesting historical allusions to Napoleon I and Napoleon II, and also, and mainly, of references to the present war as "a war for culture." Among his amusing remarks in dealing with the various arts of architecture, painting, music and sculpture, was the following: "Painting has not suffered so much, but music has been horribly mangled, so far as new patriotic poems set to music go. They have been written and typewritten and published and sung in private and public. I have had the honor of sidetracking one of them already and I intend to sidetrack as many more as possible. Dr. Vogt may have a similar experience. His choir will be asked to sing half a dozen patriotic odes this year. I may submit one myself. I am giving him notice now so that he will not be unduly shocked when he gets it."

Dr. Vogt's speech contained most interesting and instructive allusions to both art and music. He suggested that the remarks of Mr. Bridle as to the razing of certain places on the Continent during the war suggested the thought that it might not be a very bad thing if some such dire tragedy as war might perhaps strike this country some time. We have some examples of architecture in the city of Toronto, in fact too many, that he had no doubt that architects themselves would like to see eliminated. He also said that Mr. Bridle was quite correct in venturing a guess that already the community is being swamped with the efforts of amateur poets and would-be musicians. He has had sixteen poems submitted to him since the first of September. All of which are supposed to mark an epoch in the literary history of Canada and all of which are well deserving of the very best efforts of any musician who would undertake to set them to music.

The speaker in dealing with music paid a great tribute to the capacity of Britons generally in regard to appreciation of "absolute purity of intonation." The British bands are models in this respect. One great thing in regard to the British choruses is the fact that in spite of all temptations to diverge from the proper paths they will sing in tune. They may be sometimes lacking in the fiery temperamental qualities which distinguish choral singing across the channel in Belgium and France, but they have such qualities as the Belgian and French choirs find it very difficult to equal. We have in this country opportunities of profiting by the example of all other countries. The natural material is unsurpassed anywhere and I believe that in music as in architecture we are destined to play a very important role in the history of the world.

Col. Van Nostrand, in responding, gave a most interesting account of the formation of the Engineers Club, and suggested that it might be well for the architects to forget the exclusive name "Engineers" in the name of the club and join it. He concluded with an interesting expression of regret that he felt that he could not discuss the strategy of the war, at all events just then, because the *Star* had suggested that a fee of $2.00 be imposed for a license to act as an "arm-chair critic," concluding with the remark, "for that reason I will not touch on the war," or he might be fined for talking without a license.

The president then proposed the health of Edmund Burke as one who might be regarded as the father of the Association, to which toast Mr. Burke fittingly responded. Mr. Reed was called upon to respond to the toast to the Press, a matter which he accomplished in a very felicitous manner.

Before the party left the dining room, Mr. Gregg, upon behalf of the convention committee, intimated that any guests who desired to do so were at liberty to remain during the afternoon, and to make use of the grounds and club house.

Standardization of Sizes of Advertising Matter

AT the recent convention of the Ontario Association of Architects, J. P. Hynes presented the matter of manufacturers' catalogues as follows: "I might call attention to another practical question. You may be aware that the American Institute had a Committee considering catalogue publications for advertising as it affects architects. They have asked advertisers to adopt two standard sizes for catalogues. It is not necessary to go into details of that, but I think it would be advisable for this association in convention to pass a resolution endorsing the recommendations made by the American Institute and asking the advertisers to adopt same standard. I would so move, if anyone sees fit to second it."

The above resolution was unanimously carried and in order that all concerns may fully understand the action taken by the American Institute of Architects we quote verbatim the amendments adopted by this organization which have been endorsed by the O.A.A.

First. That 8½ x 11 should be the standard size for all catalogues and bulletins intended for permanent filing by architects.

Second. That all catalogues should be issued in the form of separate bulletins, each treating of but one subject.

Third. That 3¾ x 8½ should be the standard of size for pocket editions intended for the use of architects.

While the above action is only an endorsement by the architectural body in Ontario, we feel that all advertisers would profit by conforming to the sizes adopted. The Chicago Architects' Business Association and other bodies have already accepted these sizes as standard and it is safe to assume that it will be universally adhered to by all up-to-date companies.

In order to appreciate the reasons for adopting the three amendments quoted above, part of the standing committee's report is given herewith:

The committee believes that a satisfactory filing system can become possible only by the general adoption of a standard size of page, preferably the 8½ x 11-inch letter sheet, in combination with a system of separate catalogues or bulletins for each item of manufacture, which could be filed together with other items of similar character, under the proper title, and placed in the files in alphabetical order.

With the adoption of the vertical method, filing becomes a simple matter, and such a file would be as convenient for reference as an encyclopedia, in fact, the vertical filing drawer would become a veritable encyclopedia of building materials and specification memoranda, which, when fully perfected by the introduction of a standard system of indexed guide cards, would be of inestimable value to the architect.

To-day there are sundry schemes for the placing of catalogues in the office files, by outside parties whose incentive is that of obtaining a fee from the advertiser. All are familiar with the huge and unwieldly permanently bound volumes of extracts from the catalogues of advertisers, whose mater may or may not appear in the next issue.

Owing to the incompleteness of such schemes,

CONSTRUCTION

A · JOURNAL · FOR · THE · ARCHITECTURAL
ENGINEERING · AND · CONTRACTING
INTERESTS · OF · CANADA

FREDERICK REED, Editor

H. GAGNIER, LIMITED, PUBLISHERS
Corner Richmond and Sheppard Streets,
Toronto - - Canada

BRANCH OFFICES:
MONTREAL—171 St. James Street
NEW YORK—156 5th Avenue

CORRESPONDENCE.—All correspondence should be addressed to "CONSTRUCTION," Corner Richmond and Sheppard Streets, Toronto, Canada.

SUBSCRIPTIONS—Canada and Great Britain, $3.00 per annum. United States, the Continent and all Postal Union countries, $4.00 per anum, in advance. Single copies, 35c.

ADVERTISEMENTS—Changes of, or new advertisements must reach the Head Office not later than the twentieth of the month preceding publication, to ensure insertion. Mailing date is on the tenth of each month. Advertising rates on application.

CONTRIBUTIONS—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and duly returned.

Entered as Second Class Matter in the Post Office at Toronto, Canada.

Vol. VII Toronto, November, 1914 No. 11

STANDARDIZATION OF SIZES OF ADVERTISING MATTER—Continued

the architect is obliged to maintain other files to take care of catalogues not included in the catalogue agent's system, as well as for new matter which is continually being received. Manufacturers complain of these methods, realizing that, no matter to how many advertising schemes they subscribe, they must also issue catalogues so as to cover the entire field, as well as for circulation to the general public.

In order to procure a permanent filing of their advertising matter, manufacturers are not only ready, but anxious, to furnish catalogues and bulletins in size and form convenient to architects.

There are many reasons in favor of the adoption of the 8½ x 11-inch page as the standard of size for all catalogues and bulletins, and for the adoption of a systematic series of independent bulletins, especially in conection with a detailed alphabetical (and topical) system of sub-indexing under main titles, for groups of bulletins, such as builders' hardware, plumbing goods, electrical fittings.

While the so-called pocket-size catalogue cannot be expected to cover the entire field, it can serve a sufficiently useful purpose to warrant its consideration. Many manufacturers find the pocket edition indispensable for distribution amongst the general public; and as there is no desire to limit the advertisers to the 8½ x 11-inch standard, it is desirable that a standard of size, preferably 3¾ x 8½ inches, be adopted.

This size is small enough for the pocket, and may be conveniently filed in standard letter-filing drawers, which can be subdivided at small expense into three longitudinal compartments, equipped with follower blocks and guide cards, similar to the equipment of the standard drawers now used for filing legal papers.

* * *

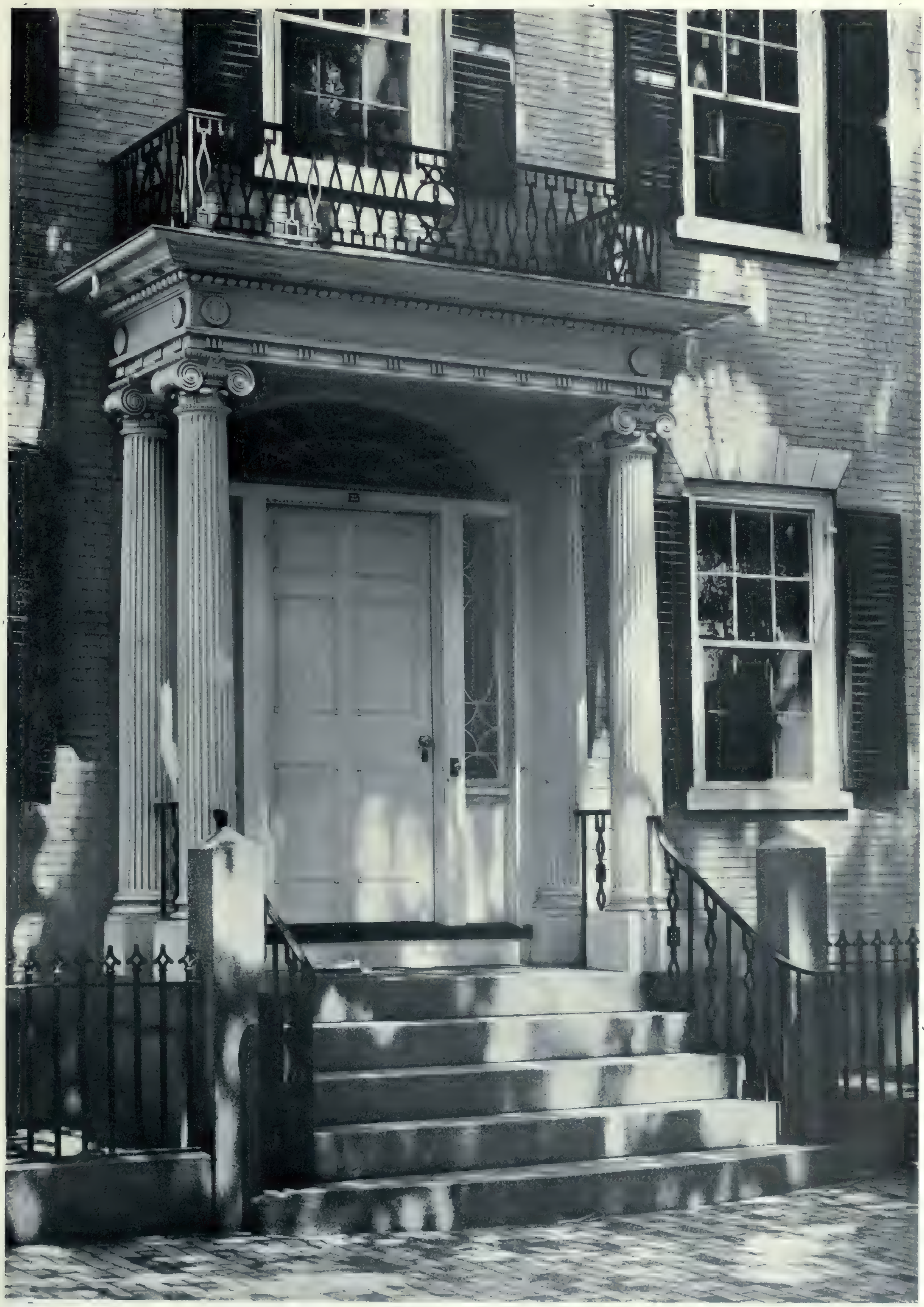
MR. FRANK MALLORY, Toronto, has taken over the architectural practice of the late F. H. Herbert, with whom he was identified for a number of years, and will continue the office at 65 Adelaide street east. Among other work, Mr. Mallory has charge of the new ten story Nordheimer building, Yonge and Albert streets, on which operations have lately been resumed.

* * *

A. T. ENLOW, formerly associated with The Pedlar People, Limited, of Oshawa, as Director of Sales and Advertising, has resigned. Mr. Enlow was formerly connected with steel producing interests in the States and has been with The Pedlar People for two years. His future plans have not yet been announced.

* * *

THE Council of the Royal Institute of British architects have awarded the Henry Jarvis Travelling Studentship in Architecture for 1914 to Ernest Comier of Montreal, Quebec. This is the first time that a Canadian has obtained such distinction and should be the means of inspiring the draftsmen throughout the Dominion to aim high and work hard to duplicate this act which brings with it considerable credit and honor. Mr. Comier is a C.E. and B.A. Sc. from the Polytechnic School in Montreal, and has also studied six years at the Ecole des Beaux-Arts of Paris, leading to the title of "Architecte Diplome par le Gouvernement Francais."



COLONIAL ENTRANCE TO SILSBEE HOUSE, SALEM, MASS., 1797.

OWING to the state of war existing, the Government of the Commonwealth of Australia has decided to postpone, until a more favorable time, the competition for the design of the Federal Parliament Houses to be built at Canberra. It was intended that the competition should be open to architects from all parts of the world, and that it should close in London and Melbourne during March, 1915.

* * *

THE damage done to Rheims Cathedral is officially given in a note isued from Bordeaux by the French Under-Secretary of State for Fine Arts, which says:

"Rheims Cathedral was shelled several times. It had all the roofing burned and the stained-glass windows riddled, and to a large extent broken. The northern tower of the facade, which was struck by shells in the upper part over the portal, was seriously damaged by flames. The sculptural decorations and statues are irreparable. Inside the church, straw, which had been collected for the wounded, caught fire, generally damaging the stonework. The wall facings are burnt and the masonry charred. Instructions have been given to protect the vaults by building temporary roofing."

* * *

BRUGES, A RECORD AND AN IMPRESSION, is the title of a new book by Mary Stratton. This treatise contains one hundred and twenty illustrations by Charles Wade, all of which furnish an added interest on account of the pleasing and expressive technique so characteristic of all the artist's work. This book, which has been in preparation for some time, should be of lively interest to-day, when the valor of the Belgians has aroused the admiration of the whole civilized world. What is written of Bruges is typical of Belgium. The spirit of the men who built the old Flemish city, who fought for its freedom and sacrificed their lives in its defence, is the same spirit that has impelled the heroic resistance with which the Belgians have met their invaders.

Bruges is one of the most beautiful mediæval cities in the world. Travellers of all nationalities have felt her fascination. Much remains to recall the days when Bruges, the capital of West Flanders, was distinguished both as a centre of commerce and a meeting place of scholars, poets, artists and men famed for their rank and valor. An added interest is given to the book by the end-papers, which consist of a useful map of Bruges drawn in Mr. Wade's characteristic manner. The work is published by B. T. Batsford, Ltd., 94 High Holborn, London, at a cost of $1.25.

* * *

SEVERAL novel features have been introduced into construction of the Morris Folding Tubular Steel Tripod, described in bulletin Y17, a copy of which has been submitted to us by the Herbert Morris Crane & Hoist Company, Limited. One feature which will appeal to contractors, structural engineers, stone workers and other users of this kind of lifting gear is the ability to fold up the tripod without removing any bolts or pins. A broad flange is provided on each foot to enable the tripod to carry a load on soft ground, and a square point gives a good "grip" on harder surfaces. Another new feature is the provision of a small pulley at the top of the tripod by which a small rope can be used to haul up the heavy lifting block or to handle very light loads quickly. It is also worthy of note that even in the one-ton capacity the tripod is light enough for one man to carry on his shoulder.

* * *

THE American Gas Institute and the National Commercial Gas Association have authorized a joint committee to offer a prize of $150.00 for the best designs of a replace heater, burning gas. The committee wants the design of a heater which may be placed in the open fireplace of the library, living-room or dining-room of an artistically furnished dwelling, appropriate for the purpose and artistically consistent with the furnishings of the room. The appearance when unlighted, is of equal importance with the appearance when lighted, and in awarding the prize, these two features will be given equal prominence.

The award will be made by the committee on the recommendation of a jury composed of three members, an architect (to be nominated by the American Institute of Architects) a member of the American Gas Institute and a member of the National Commercial Gas Association. The competition will close on March 1st, 1915, at which time the designs must be in the hands of the Chairman of the Joint Committee, Wm. J. Serrill, 1401 Arch street, Philadelphia, Penna. Mr. Serrill will also furnish further information upon request.

* * *

"CERTAINTY"

is what is sought for by everyone. With the Architect and Engineer this is particularly true

The Dietzgen Instruments and Materials are manufactured in our own Factories under the discipline of establishing Accuracy and Dependability; always with the idea of the exacting purpose for which they are intended, and not simply as merchandise to sell—to co-operate and verify with exactness the thought behind their use.

EUGENE DIETZGEN CO., LTD.,
116 Adelaide St. W., Toronto.

CONSTRUCTION

December, 1914 Vol. 7, No. 12

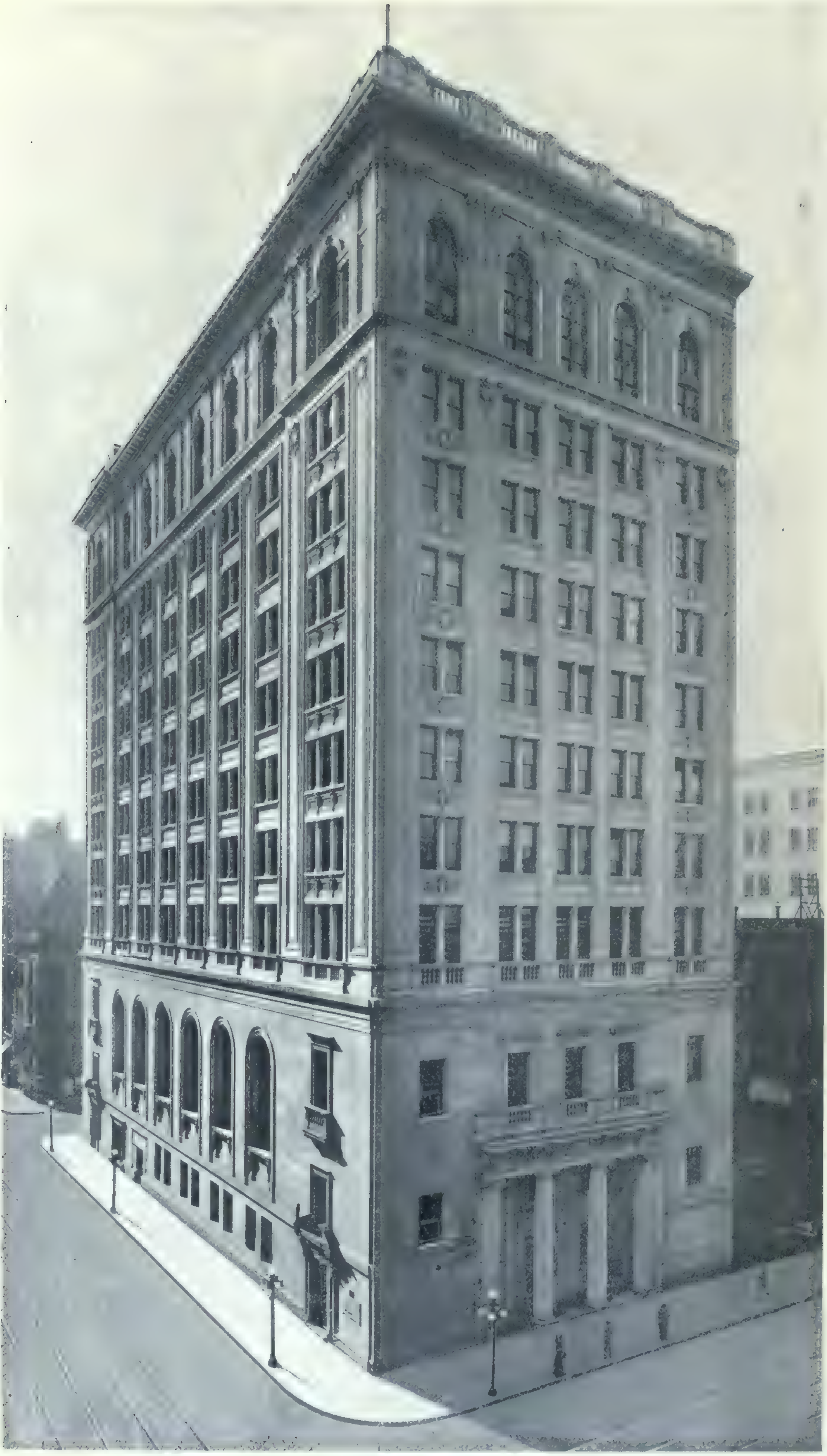
CONTENTS

EDITORIAL 425
Dominion Bank building as an example of art and practical equipment —Canada in its relation to existing war conditions.
DOMINION BANK BUILDING, TORONTO 427
DOMINION BANK BUILDING, MECHANICAL EQUIPMENT 447
ANNUAL MEETING OF THE SASKATCHEWAN ARCHITECTS 456
HOUSE ON SHERBROOKE STREET, MONTREAL 457
TRADE NOTES 462
INDEX TO CONSTRUCTION FOR 1914 463

Full Page Illustrations

DOMINION BANK BUILDING, EXTERIOR .... Frontispiece
DOMINION BANK BUILDING, MAIN BANKING ROOM 426
DOMINION BANK BUILDING, DETAIL OF WINDOWS 435
DOMINION BANK BUILDING, BOARD ROOM 440

H. GAGNIER, Limited, Publishers
GRAPHIC ARTS BLDG., TORONTO, CANADA
BRANCH OFFICES
MONTREAL NEW YORK



THE NEW DOMINION BANK BUILDING, TORONTO.

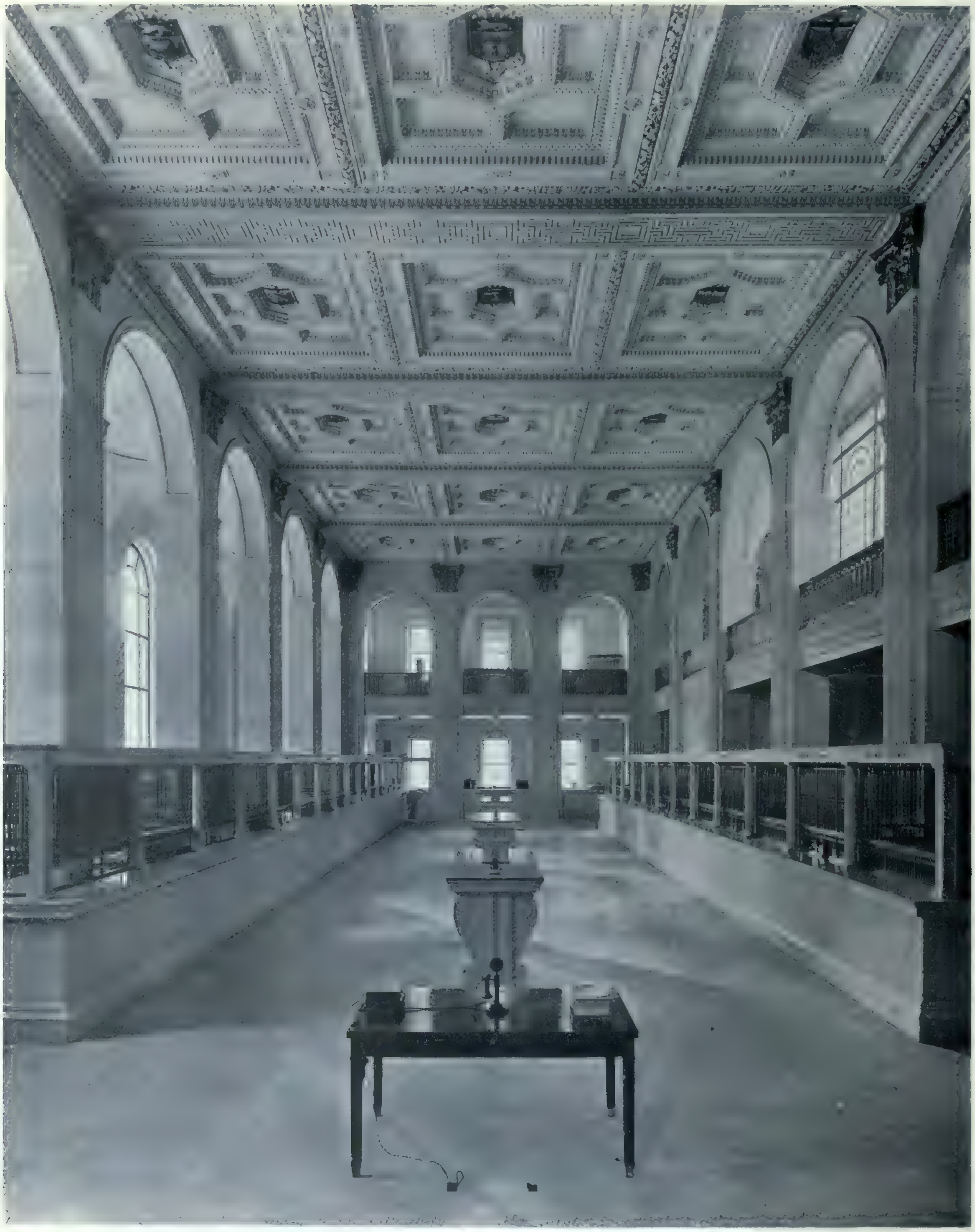
DARLING & PEARSON, ARCHITECTS.

The Dominion Bank building as an example of esthetic character and internal arrangement both in respect to allotment of space and kind of furnishings.

At the corner of King and Yonge streets, Toronto, three lofty edifices give expression to the marvelous advance made in twentieth century architecture. The Dominion Bank, the Canadian Pacific Railway Company, and the Royal Bank, all stand as living testimonials to the great commercialistic tendencies of the present age. To some they breathe the spirit of prophecy, foretelling the dire result which must come if we insist on letting the greed of gold continue its ruthless devastation of all the finer sensibilities of our true nature. To others they express the acme of all that can be summed up in the word success. More wonderful than the Pyramids of Egypt, more attractive than the Hanging Gardens of Babylon, more beautiful than the Parthenon at Athens—they seem to these people at least to combine the characteristics of all that counts in life. And while this small space contains three buildings of greater height within a limited area than any other city with the possible exception of New York; in spite of the prejudice which exists against the erection of skyscrapers in cities of unlimited area; and acknowledging the various arguments advanced as to congestion, sanitation, etc.; the consensus of opinion still holds favorable in regard to their esthetic character and structural attainment. In the Dominion Bank one other phase should be considered carefully, viz., the practical arrangement of the various floors—and the amount of study given to the equipment and furnishings. The vault, for instance, embodies features which are a guarantee in themselves of absolute protection; the lighting of the main banking room is as nearly perfect as the man of imagination might picture; the working desks and tables ingenious in every part and detail. In fact the whole structure throughout has been considered from one standpoint—the economic arrangement of space and labor. That the Dominion Bank building ranks among the finest institutions of its kind in America is unquestionable, and should be held in high esteem by the Canadian people. It is one more monument erected through the hearty co-operation of architects, engineers and contractors in an effort to reach a lofty degree of perfection. And by a proper appreciation of such work can we only hope to attain the highest state of excellence in the realm of architecture and give to our cities a stately, wholesome and dignified appearance along natural lines.

The present conditions and what our attitude should be on the basis of natural resources and our future relations to foreign as well as home consumption.

The draftsman finds himself without a position; the architect is compelled to cut his force in half and sometimes close his office temporarily; the contractors in turn find a dearth of building projects and practically suspend operations or continue to manufacture their goods on the basis of future possibilities; the client fearing an oncoming depression, refuses to continue the projects already started. What is the result? Business stagnation and cruel suffering among our people. The question naturally arises, under the existing circumstances should such conditions prevail. In making an analysis we must not forget the natural resources and inherent wealth of Canada. We have to bear in mind continually that our country is self-supporting. All of which reduces itself to one important fact, viz., that in the direst extreme we could not only exist within our own boundaries, but could also work out an economic solution which would enable this country at least to eliminate the causes of so much wanton destruction to the progress of civilization. Let us ask again, are our policies right and are we taking the true perspective? In view of past progress, our present development and future possibilities, should not the Government carry out all schemes of internal improvement contracted for, and in addition plan even greater projects for the benefit of our unemployed? Should not the corporations and institutions continue the work on buildings started but not completed? Surely so and for several reasons. In the first place we are not a poverty stricken nation. Again, we are one of the few countries which will receive thousands of immigrants immediately after the conclusion of the present war. We must open up new territories and make ample preparation for their coming. Our industries will be called upon to help meet the deficiencies of other nations for foreign as well as home consumption. The present time should be utilized in enlarging our existing factories and building new ones. It is our one great opportunity—are we broad enough to grasp it? Building material can be secured at an average reduction of twenty per cent. over the cost six months ago, while labor is begging employment at greatly reduced prices. It behooves us to arouse ourselves and get ready for the largest business boom ever experienced in the history of the world's progress; a boom which will make of Canada one of the great commercialistic centres.



MAIN BANKING ROOM,
DOMINION BANK BUILDING,
TORONTO, CANADA.

The Dominion Bank Building, Toronto

DARLING & PEARSON, Architects

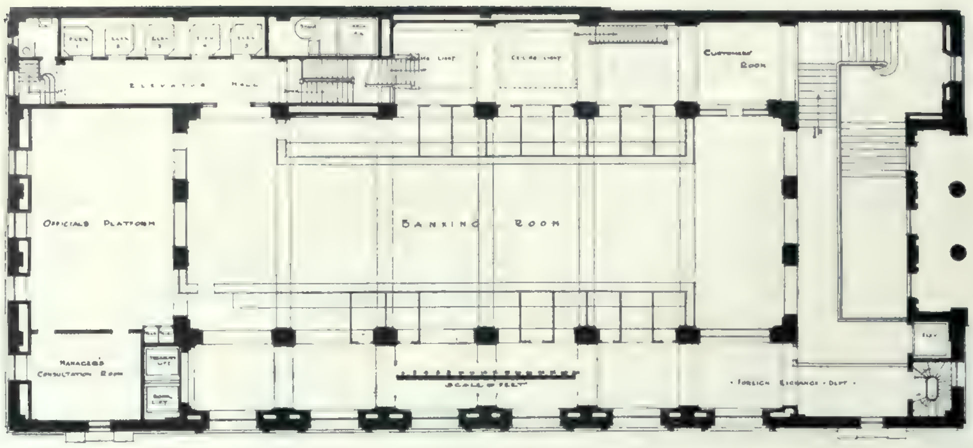
THE new Dominion Bank building, on the corner of Yonge and King streets, Toronto, comprises in itself the culmination of all the study which has been centered for years on our American-evolved skyscraper. One idea seems to have entered into the whole structure, even to the minutest detail—practicability. No phase of the work has been neglected, and as a natural result the structure presents a dignified and harmonious appearance, both upon the exterior and interior. At the same time the value of each official and employee's work has been taken into consideration, both in the careful evolving of the plan and the arrangement of the furnishings.

Rising one hundred and eighty-five feet above the ground, this structure is quite expressive of the original intentions for which it has been erected. The granite base comprises the ground and main floors; the large window treatment on the Yonge street facade indicating the banking room proper, while the lower row of openings express the location of the savings department. The smaller windows above the King street entrance designate a mezzanine floor directly over the main lobby. Seven stories devoted to office space comprise the shaft, while the arcade treatment at the top encloses the head office department of the institution.

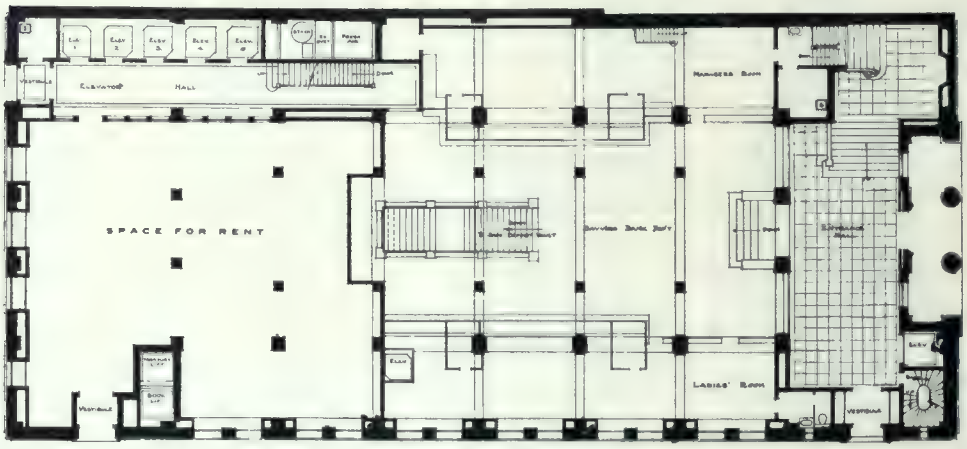
From the granite, extending fifty-two feet above the street level to the roof, the exterior is faced with glazed terra cotta, well executed and quite conformable to the style of Italian Renaissance as adhered to in the designing of this edifice. One feature which exemplifies the careful attention paid to the small details, which in turn produce the harmonious ensemble, is the method of treating the vertical lines of the shaft. Moulded as they are with no horizontal interruptions, and designed so that no vertical jointing becomes apparent, the result is not only ornate, but lends considerable solidity to the gen-

LAMP STANDARD IN MAIN LOBBY.

LIGHTING FIXTURE IN BOARD ROOM.



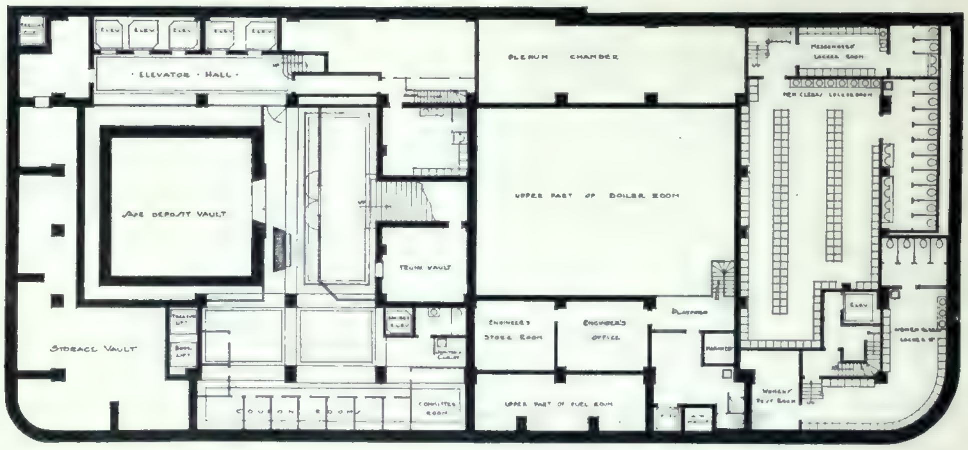
PLAN OF
MAIN BANKING
ROOM FLOOR.



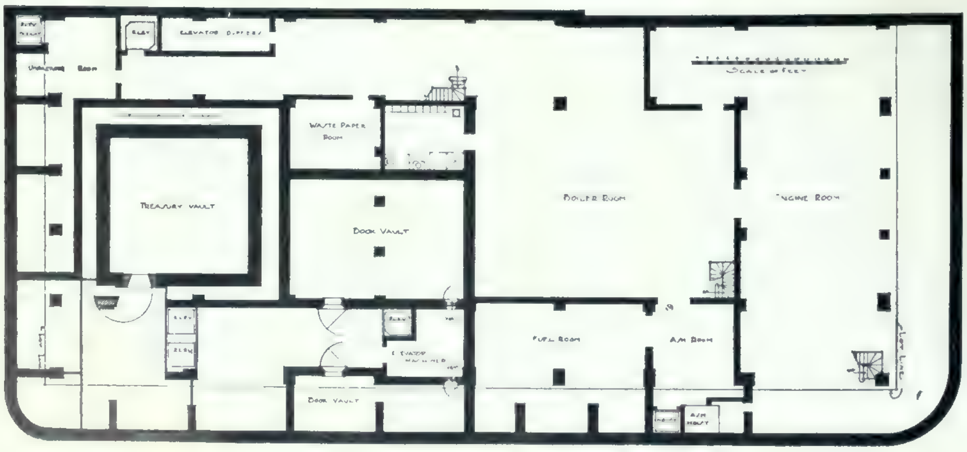
PLAN OF
GROUND FLOOR AND
SAVINGS DEPARTMENT.

PLANS OF DOMINION
BANK BUILDING,
TORONTO.

DARLING & PEARSON,
ARCHITECTS.

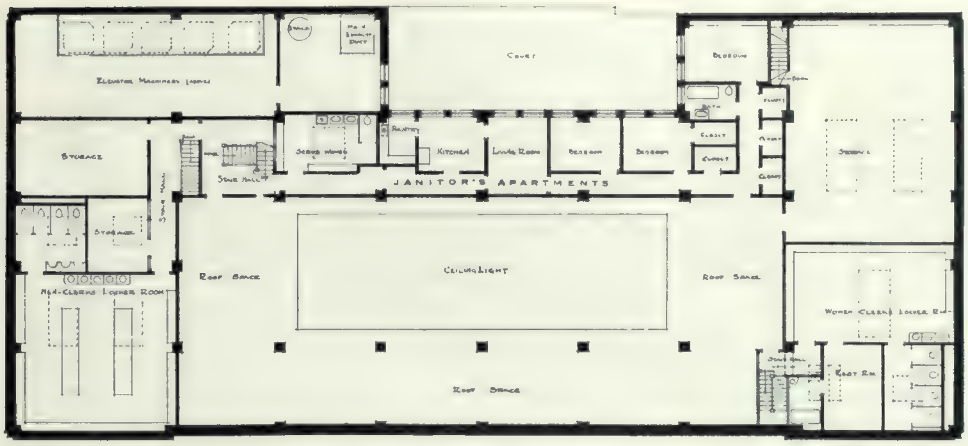


PLAN OF
BASEMENT.

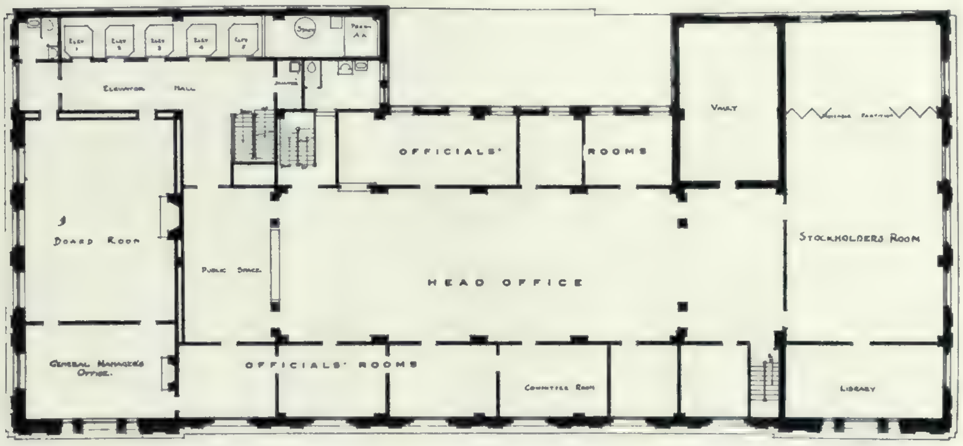


PLAN OF
SUB-BASEMENT.

PLAN OF ATTIC FLOOR.

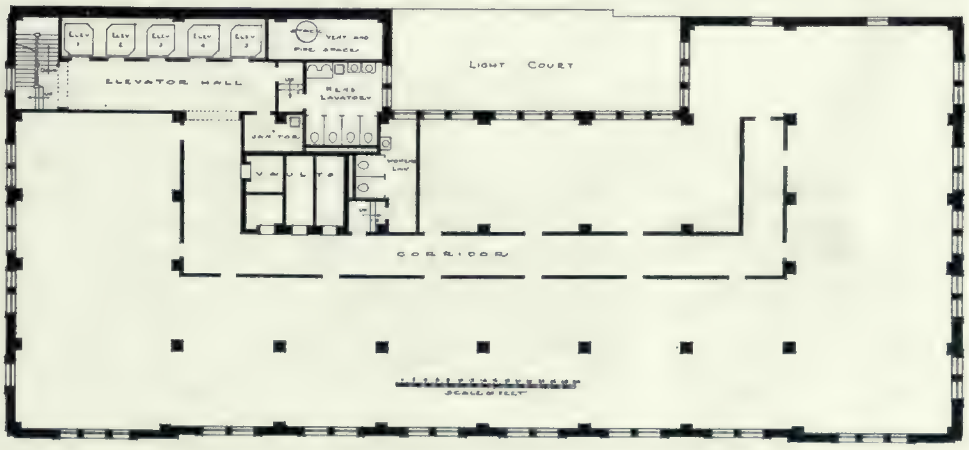


PLAN OF NINTH FLOOR.

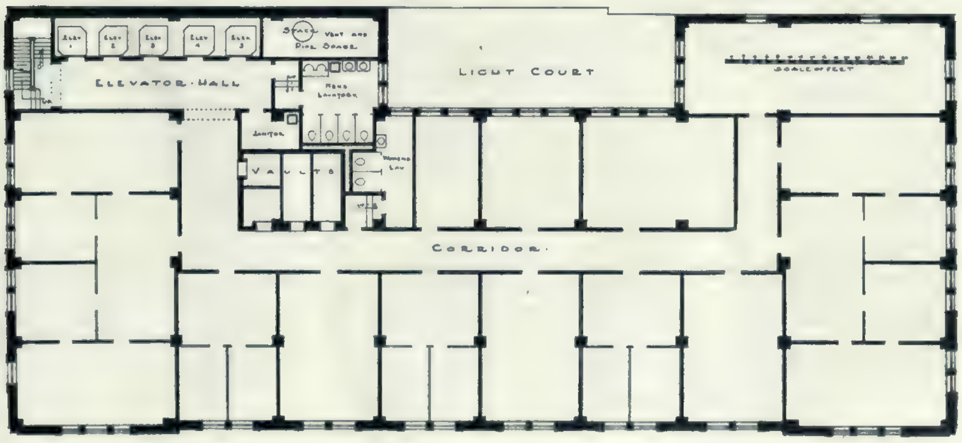


PLANS OF DOMINION BANK BUILDING, TORONTO.

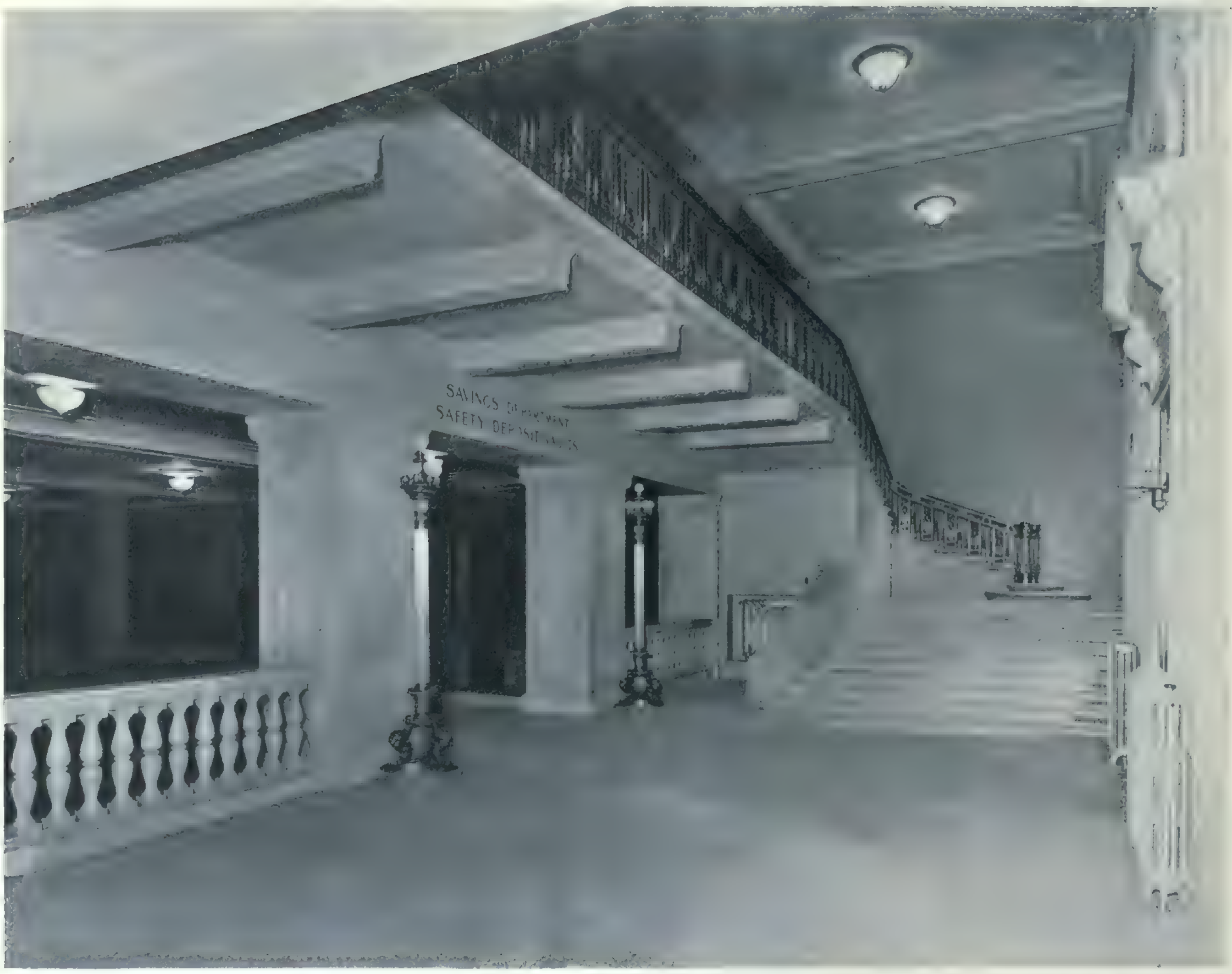
DARLING & PEARSON, ARCHITECTS.



PLAN OF TYPICAL FLOOR.



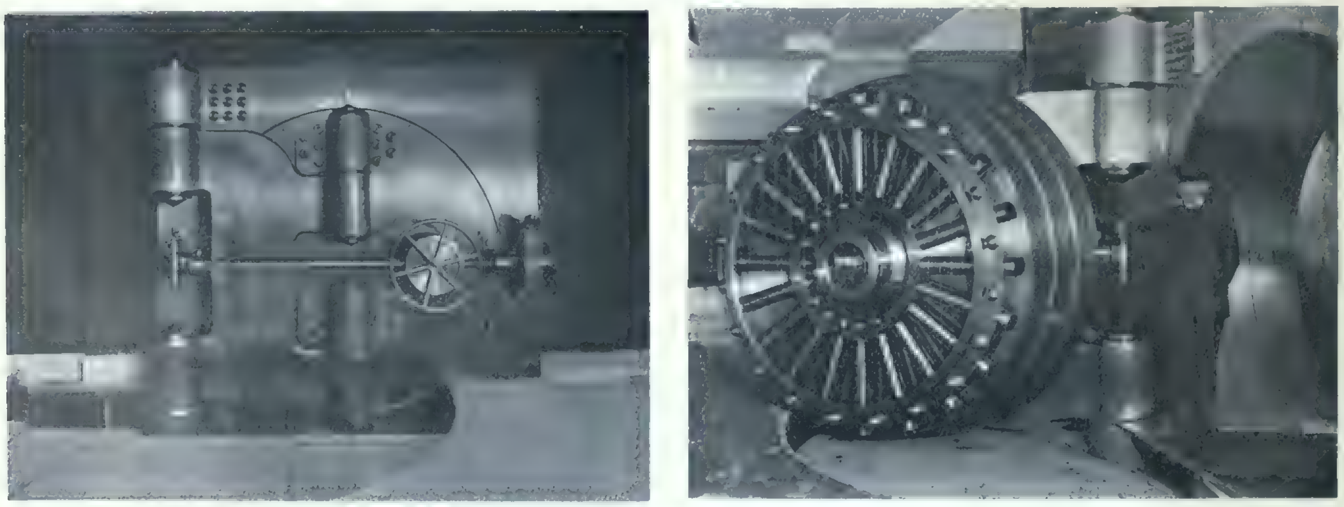
PLAN OF THIRD FLOOR.



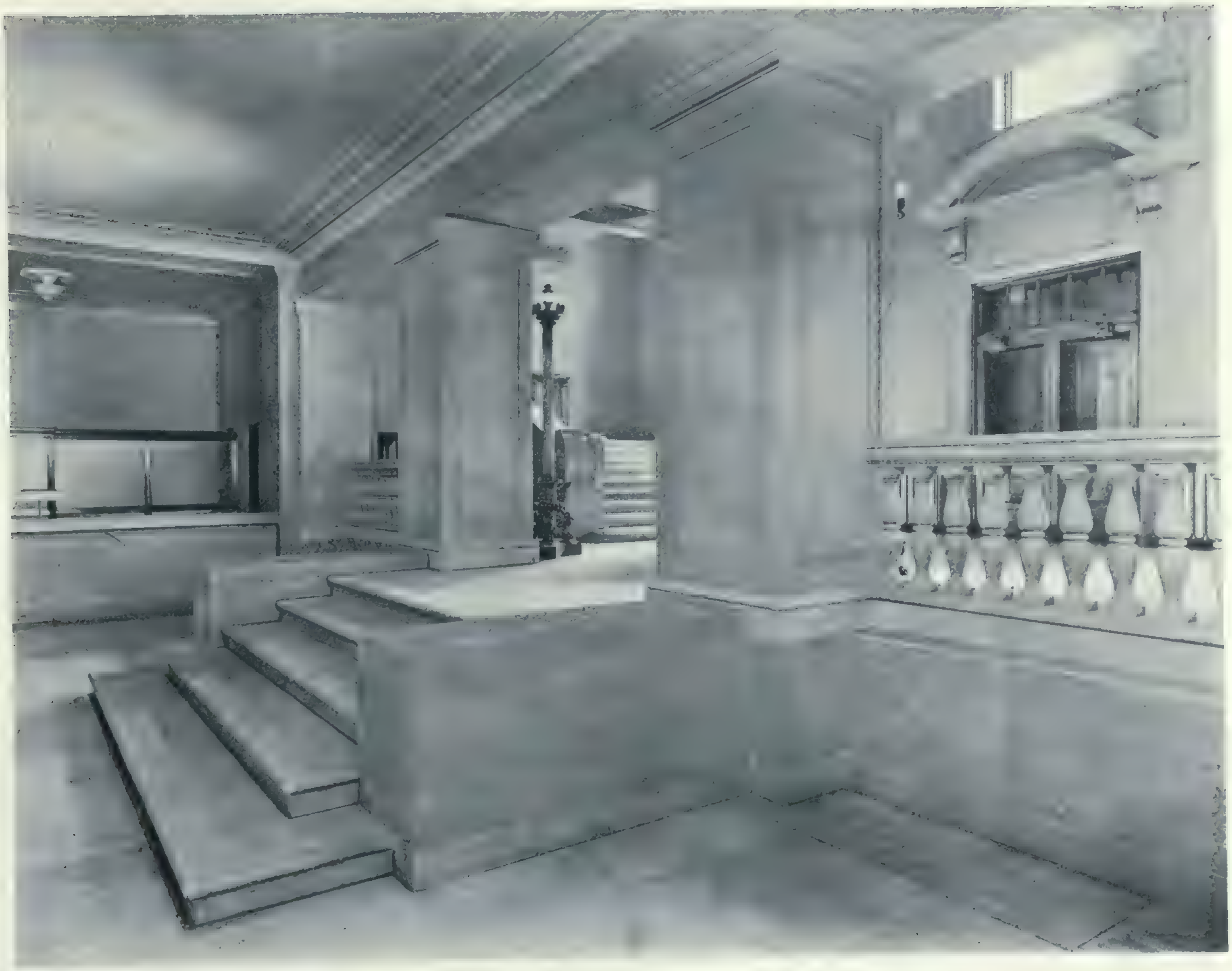
ENTRANCE HALL AND MAIN STAIRS.

eral effect, each piece presenting in appearance a square tile.

The new building is erected on the site of the old bank occupied in 1879. Since that time additional adjoining properties have been acquired, so that the present lot extends one hundred and sixty-eight feet on Yonge street and seventy-five along King. On the twenty-fourth of March, 1913, the demolition of the old bank began, and on June first the new one was started, receiving some of its tenants by the first of July, 1914. The quiet, dignified design in granite merges happily into the more delicate and ornate work above, which in turn lends itself harmoniously to the graceful and elaborate arcade treatment at the top. With the three separate features of the commercial life within adequately expressed, the units lend themselves to a perfect ensemble, characteristic of the finest examples to be found in the business centres of the present age.



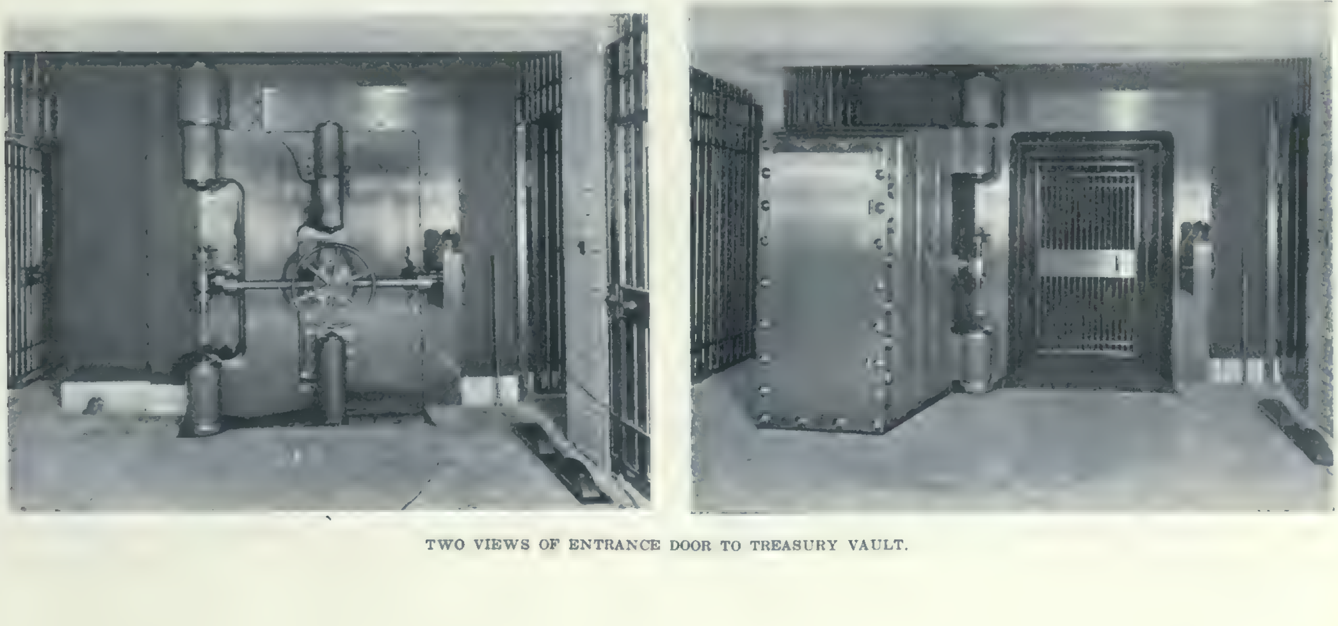
TWO VIEWS OF CIRCULAR DOOR TO SAFETY VAULT.



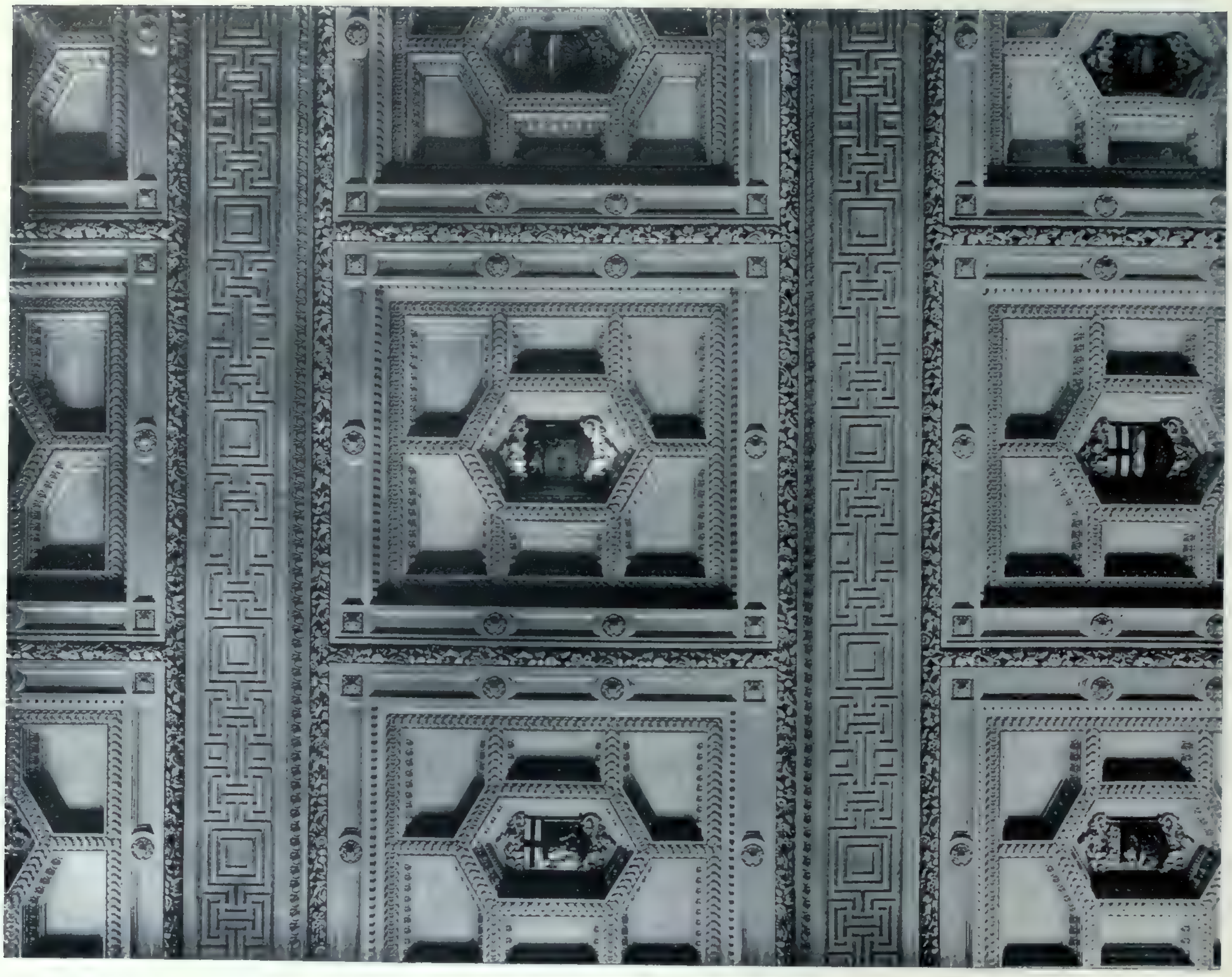
VIEW TOWARDS ENTRANCE HALL.

In addition to the entrance on King street there are two others on Yonge, one leading to the main hall, the other through a series of miscellaneous stores to the elevator lobby, which has its chief approach from Melinda street. The entrance doors leading to the main vestibule are of ornate cast bronze suspended upon heavy anti-friction hangers, and equipped with cylinder locks, master keyed like all other locks in the building. The inner doors to the entrance hall are also of cast bronze, with heavy polished brass pull-bars and glazing of special British plate glass.

Once inside the main entrance the feeling of strength and ornate simplicity is felt. To the left is the approach from Yonge street, through a revolving door located directly inside of the bronze doors already mentioned, and which has been prevented from protruding into the lobby by furring the wall to the required depth. On the right is the main stairway leading to the

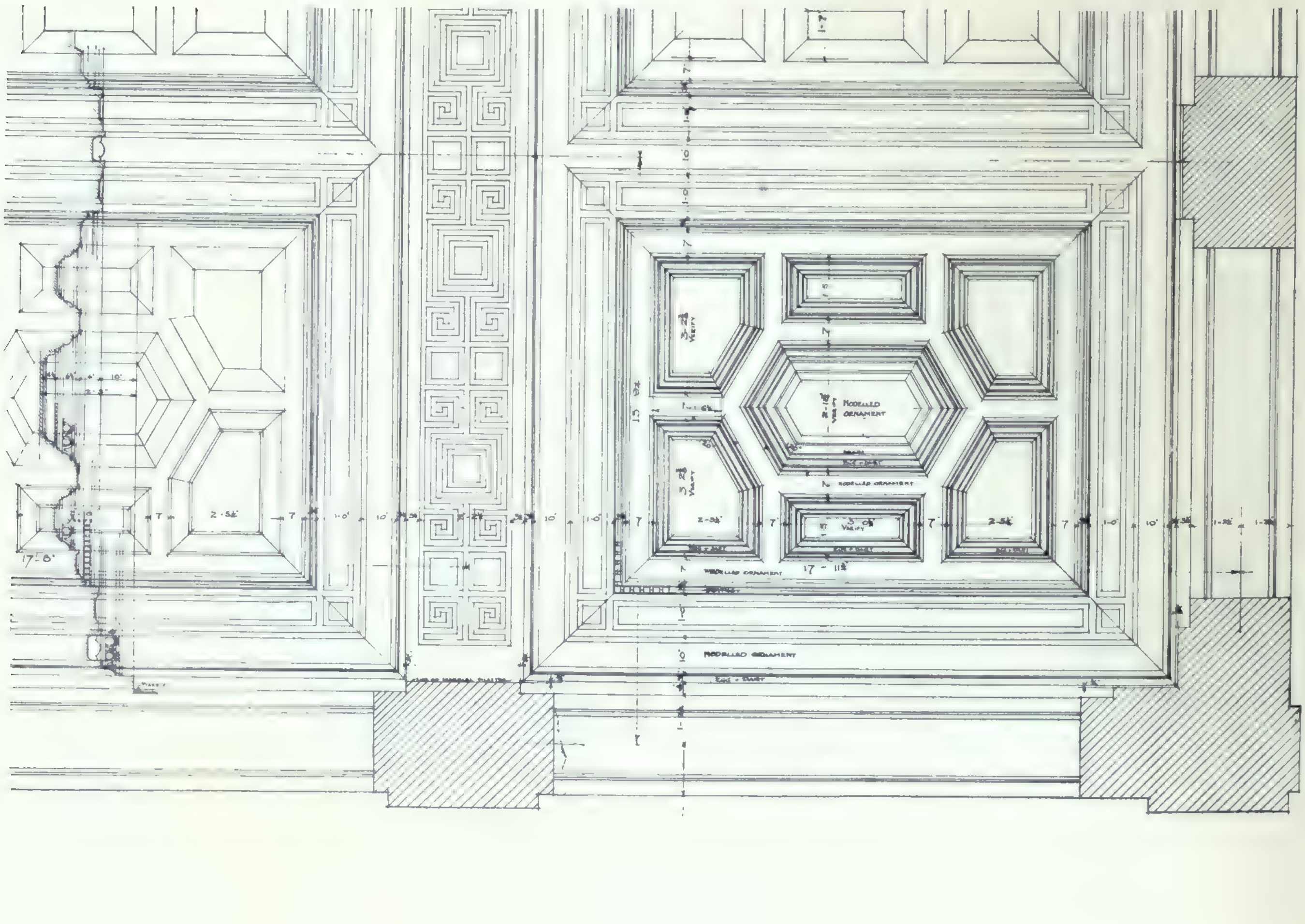


TWO VIEWS OF ENTRANCE DOOR TO TREASURY VAULT.



PLAN OF CEILING IN MAIN BANKING ROOM, DOMINION BANK BUILDING, TORONTO.

DARLING & PEARSON, ARCHITECTS.

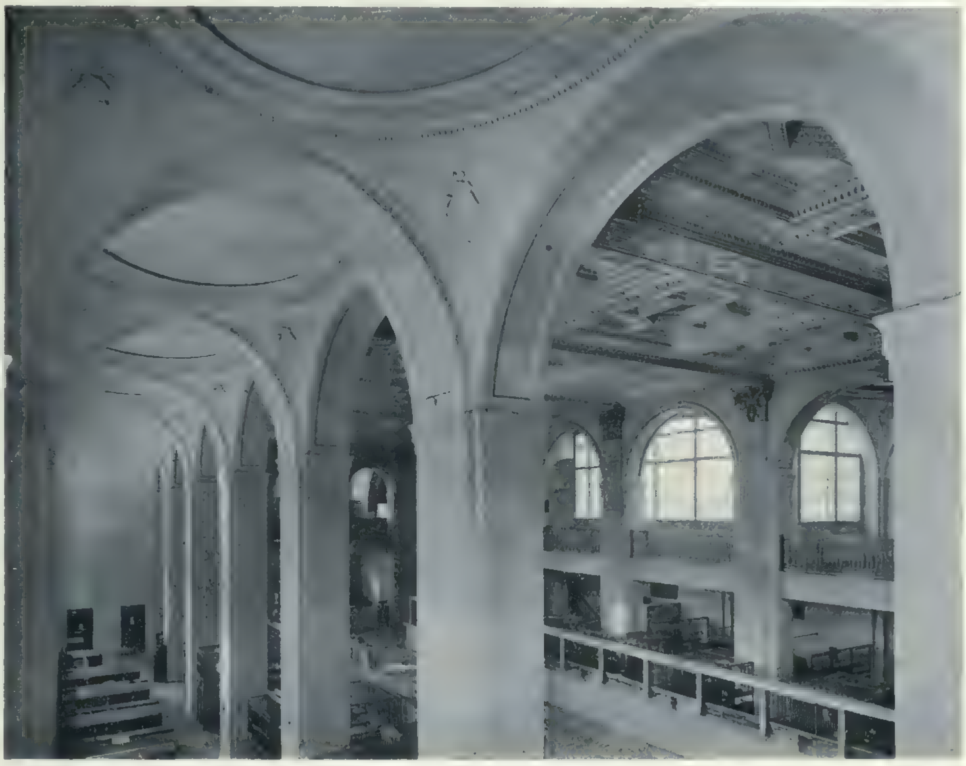


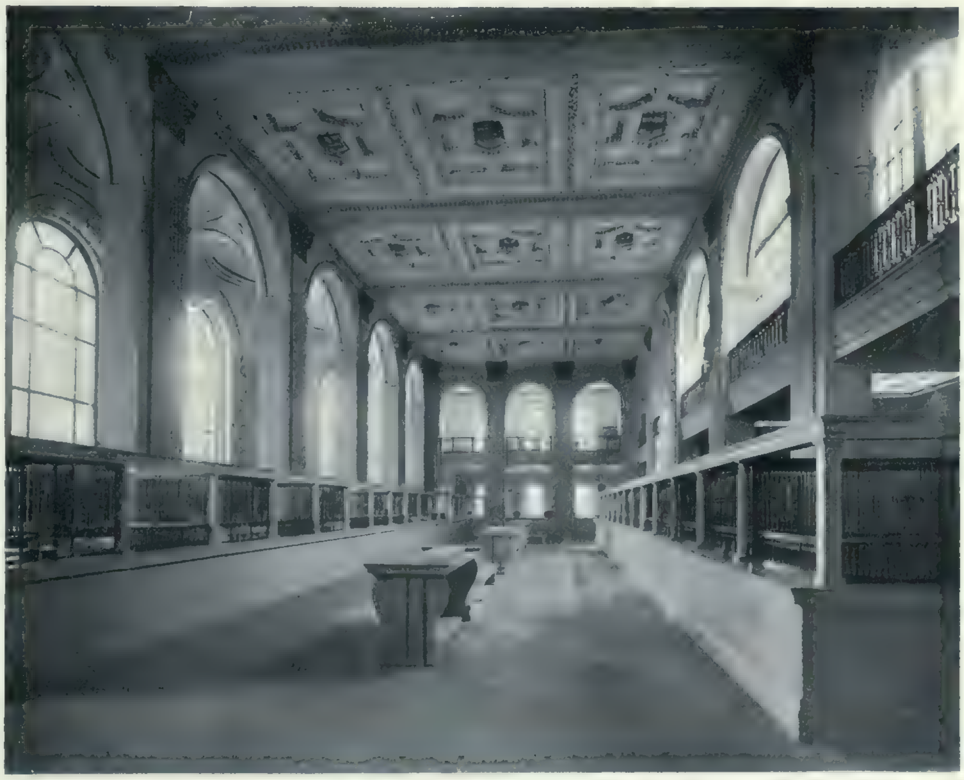
public banking room above, and straight ahead are five broad marble steps leading down to the savings department. The entrance hall, nineteen by sixty-four feet and twenty-six feet in height, is lined throughout with Tavernelle marble, which material is also used for the main stairs, the large banking room and the savings department.

Two bronze lamp standards, with frosted lights, mark the opening into the savings bank department. This room is practically a continuation of the entrance hall, extending back some seventy feet and leading directly to the vaults below by means of a broad marble stairway. The flooring here, as in the banking room above, consists of light gray Tennessee marble slabs thirty inches square, set within a reddish border. The artificial lighting is semi-direct, sixteen frosted glass bowls being hung from the centre of the ceiling panels.

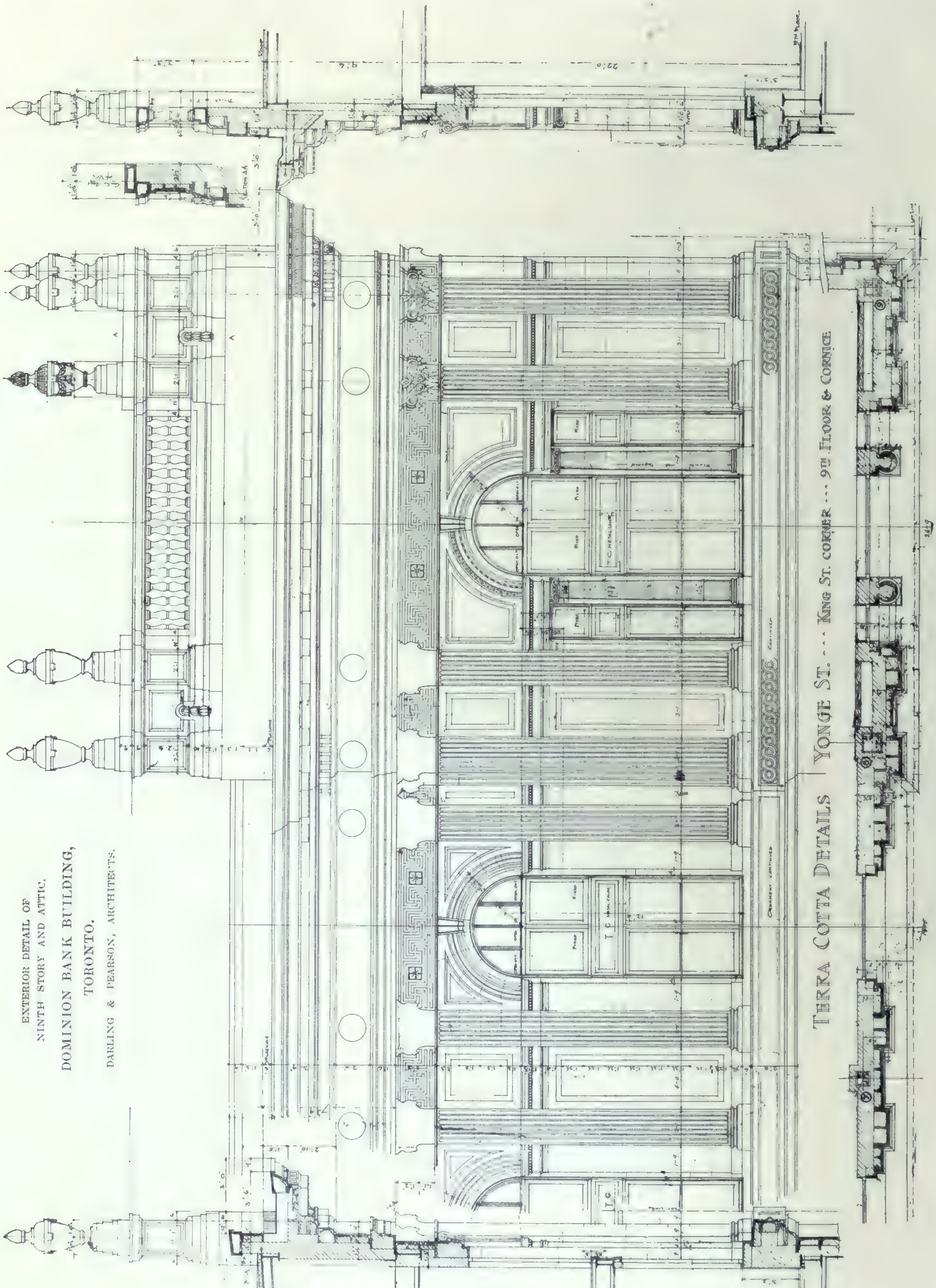
At the top of the monumental marble and bronze stairway leading from the entrance hall is located the main banking room. Eighteen piers enclose the large public space, and counter screens, while the surrounding area is planned for the official and clerical forces of the local institution. The entire room, measuring one hundred and fifty-four feet long, sixty-eight wide, and thirty-three in height, is designed in Tavernelle marble of a greyish color, excepting the floors of Tennessee marble and the ceilings of hard plaster. Extending from pilaster to pilaster, the narrow way of the room, are beams with soffits designed in a classical fret, separating the ceiling into sections, which are in turn divided into three panels, practically square. A floral band encloses the various panels, in the centre of which are introduced in their natural heraldic colors the coat-of-arms of the nine Provinces.

In studying the ceiling of the main banking room the first impression comes from the brilliancy of the whole field, each detail expressing its true relation, although some thirty feet overhead. Then the fact becomes evident that there is nothing in the way of candelabra or chandeliers to mar the view. The colors of each coat-of-arms is sharp and clear, with their cor-

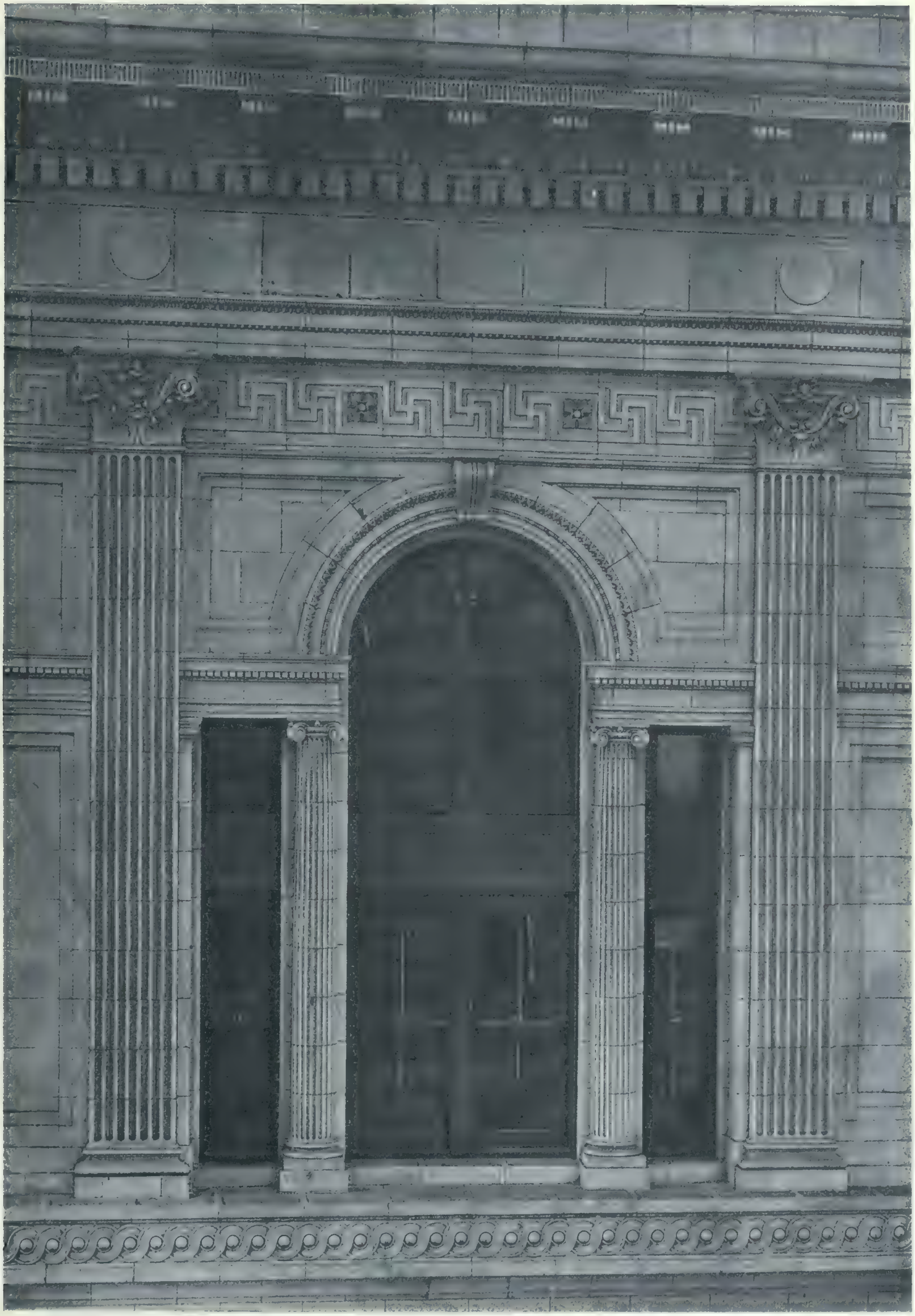




TWO VIEWS OF MAIN BANKING ROOM.

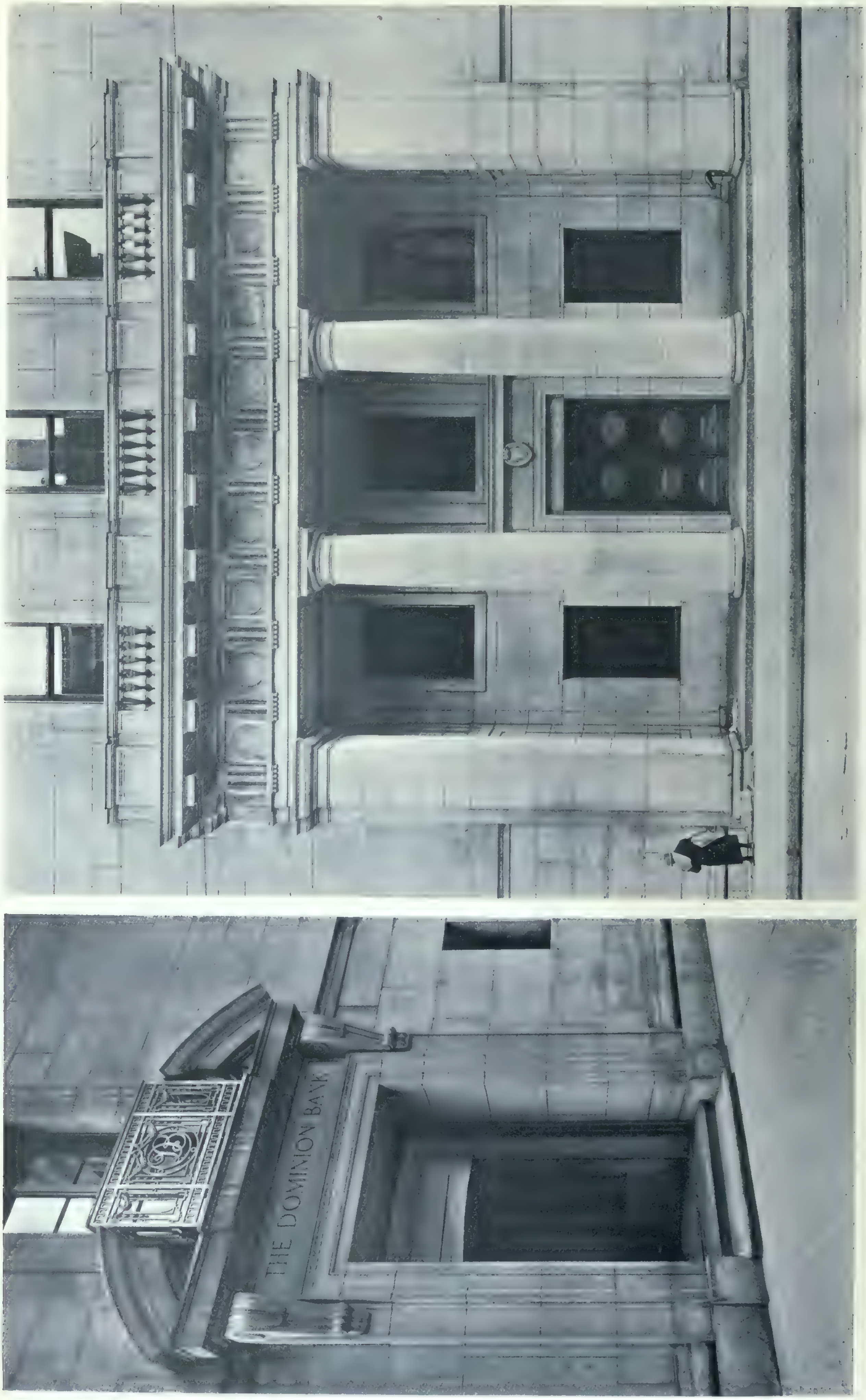

TERRA COTTA DETAILS YONGE ST. ··· KING ST. CORNER ··· 9TH FLOOR & CORNICE
SECTION AA
T.C.
FIXED

EXTERIOR DETAIL OF
NINTH STORY AND ATTIC.
DOMINION BANK BUILDING,
TORONTO.
DARLING & PEARSON, ARCHITECTS.



DETAIL OF MAIN CORNICE AND NINTH STORY WINDOW.

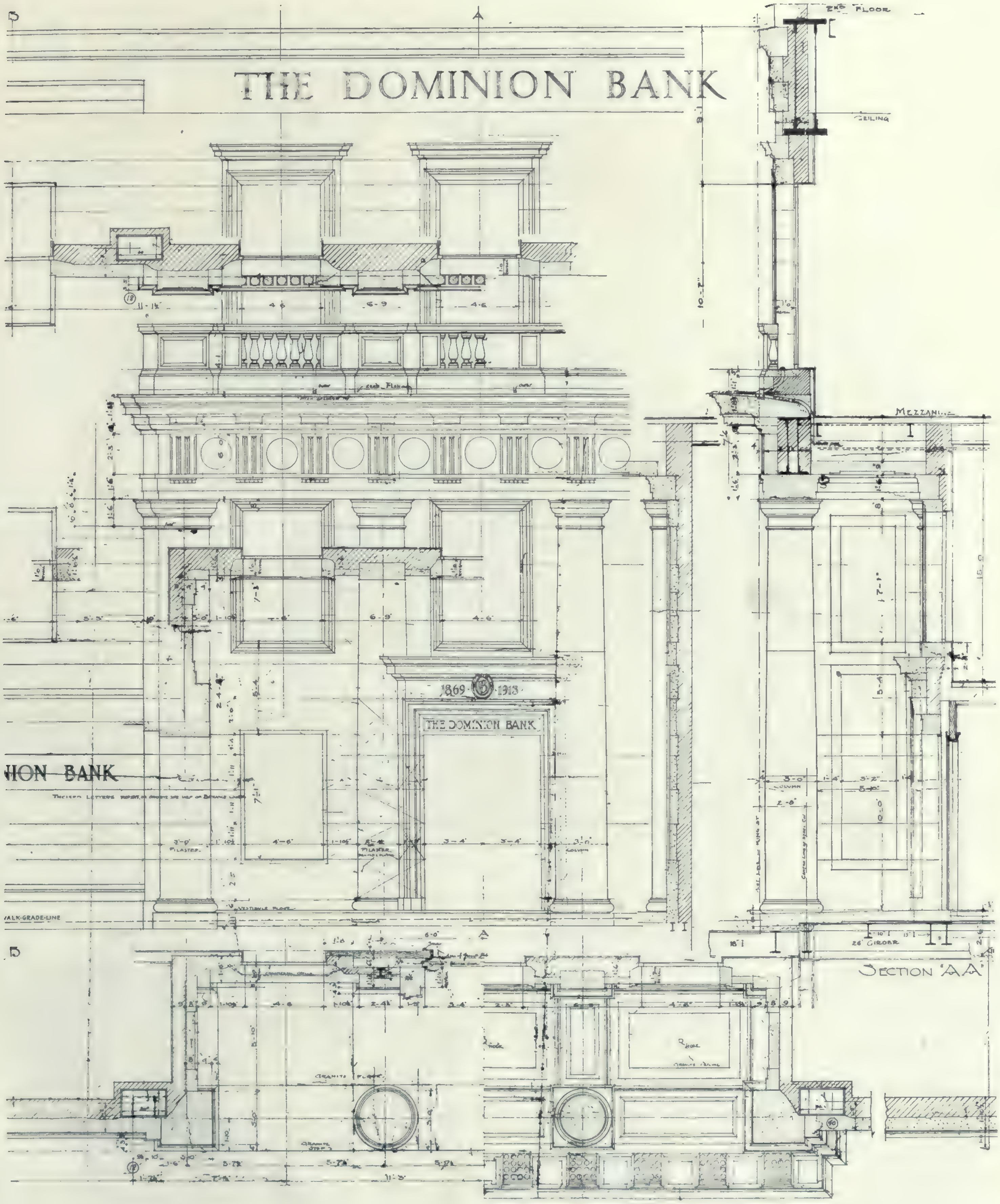
THE DOMINION BANK BUILDING, TORONTO.



YONGE STREET.

KING STREET.

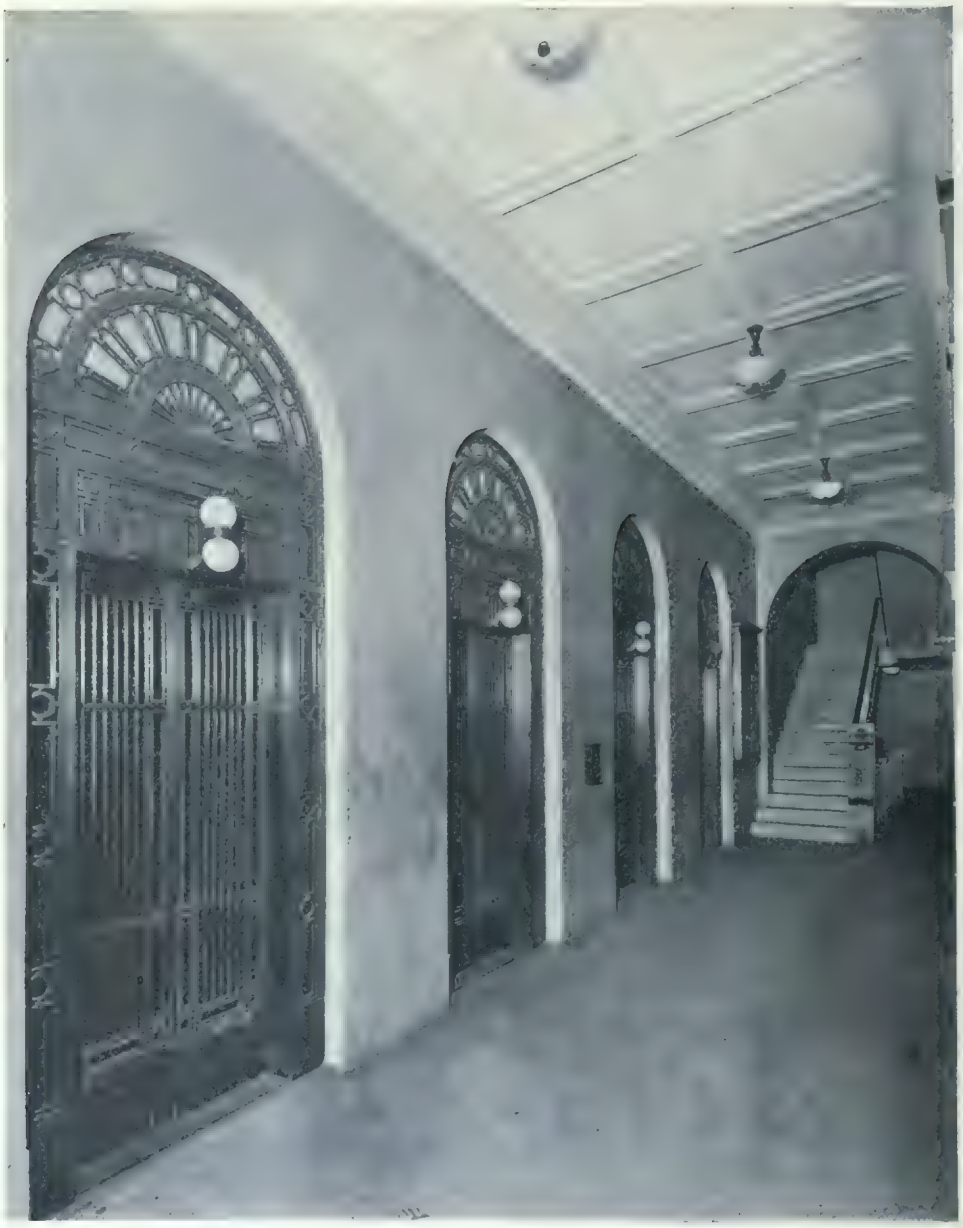
TWO ENTRANCES TO THE NEW DOMINION BANK BUILDING, TORONTO.



DETAIL OF MAIN ENTRANCE.

THE DOMINION BANK BUILDING, TORONTO.

DARLING & PEARSON, ARCHITECTS.

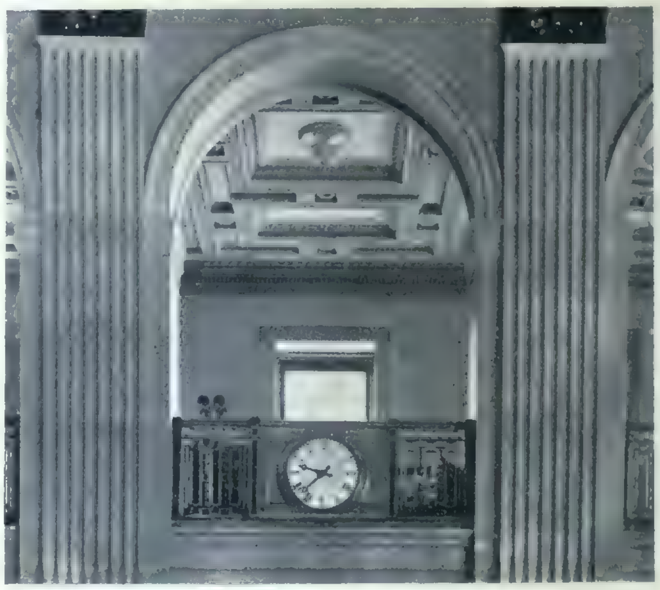


ELEVATOR HALL ON MAIN FLOOR.

responding values maintained. There is no extreme glare, as from a multitude of lights hidden in the cornice treatment, but rather an even, mellow light. To the casual observer he would doubtless depart wondering how such a bright, soft illumination is possible without some visible source from which to emanate. Herein lies one of the many devices which attribute greatly to the utility and beauty of the bank. Hidden behind the cornice of the counter screens and running the full length of the room are two narrow stretches of ground glass, one on each side of the public space. Beneath the glass are approximately three hundred lights which reflect upward, sixty passing through a red shade and the remaining through a light green. The reds occur every so often and are proportional with the green, so as to draw out the true values of the corresponding colors in the ceiling.

To the left of the banking room is the aisle along Yonge street, which contains a series of pendentive domes finished in hard plaster of a rough surface and pointed a light cream to harmonize with the general tone of the main ceiling. Directly opposite, near the entrance, is provided a ladies' waiting room, with writing desks, magazine tables, chairs and Turkish rug. A mezzanine gallery for the accommodation of the staff who have no connection with the general public, extends around three sides of the central space, enclosed by a solid bronze railing of simple but effective design. At the ends are installed two ornate clocks, which belong to a system regulating every timepiece in the building. An elaborate and musical set of chimes is connected with the one at the north end announcing the time at each quarter.

At the south end of the banking room the officers' platform, with its Oriental Turkish rug, is closely allied to the consultation room for the manager, all treated in mahogany with ornate plaster ceiling. The floor of the large public space is laid in thirty-inch square marble tile; that of the clerks in the rear of the counters, in cork tiling. Three marble check tables are at the convenience of the patrons, and covered with thick transparent



DETAIL OF CLOCK IN MAIN BANKING ROOM.

STOCKHOLDER'S ROOM.

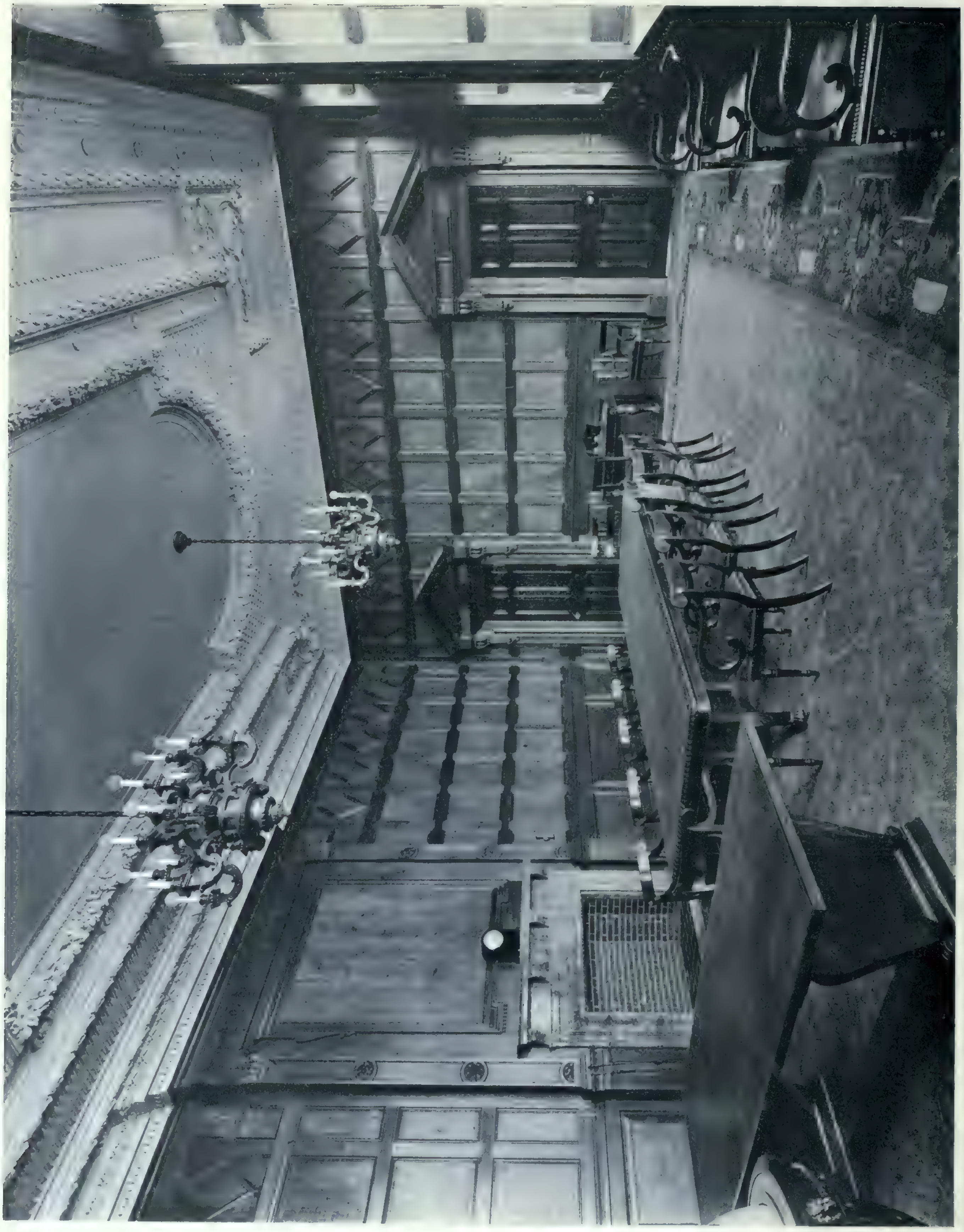
glass, under which are spaces along the sides for deposit slips, blank checks, etc., separated by glass partitions. The finish on the counters and cages is of a dull cast bronze, the polished glass of best British make, excepting for the low railings, where chipped plate is preferable.

Of unusual interest are the desks and tables used throughout the banking quarters of the building. The tops consist of a three-eighths inch thickness of cork annealed to a resistence of three hundred pounds to the square inch. Thus, in case of a dinge it will gradually heal itself and assume the original surface. At the top of the desk are guard rails with sanitary coves and a dull bronze lighting fixture with sand-blasted finish. These are designed, the hood being supplied with reflectors set at various angles, so that the direction of light extends in a straight line to the edges of the table. In this way the clerk is protected from any direct illumination, since each reflector is treated separately to meet the existing needs, while the cork covering prevents reflection. In the tables accommodating the clerks connected with the bookkeeping staff a safe has been built in the end so that the clerk can keep all his records within constant reach, and at the same time be the custodian of his own books, which facilitates his work, especially in the evenings. The doors are made so as to swing back under the top projection of the desk, and far enough from the floor to prevent any embarrassment in moving about. All legs are equipped with a bronze shoe, so that no inflammable material comes in contact with the floor surface. Each teller is provided with a truck-safe, stationed in his private cage, which is easily handled and affords ample room wherein he may keep everything relative to his work. These safes are provided with two locks, and cannot be opened except by the teller and one other person, each having his own combination. At the close of banking hours these truck-safes are locked, taken to the large vault, from whence they are returned in the morning to the teller's cage. By virtue of this system protection is guaranteed to the teller against the inconvenience by disturbance or a loss by theft.

Two entrances, one on Yonge and the other on Melinda street, lead to the elevator hall. Here are located five passenger elevators, thoroughly described in the article on "The Mechanical Equipment." The hall on the ground and first floor is of imitation Caen stone, with marble stairs, while the corresponding space above has marble dado four and one-half feet high, hard plaster and marble tile floors, the stairs being of cast-iron with wood hand-rail. The entrance between the elevator hall and the banking room is through a bronze screen, the doors being equipped with floor checks, threshold strip, pivot hinges, cylinder lock master-keyed, plate glass and polished pull and protection bars.

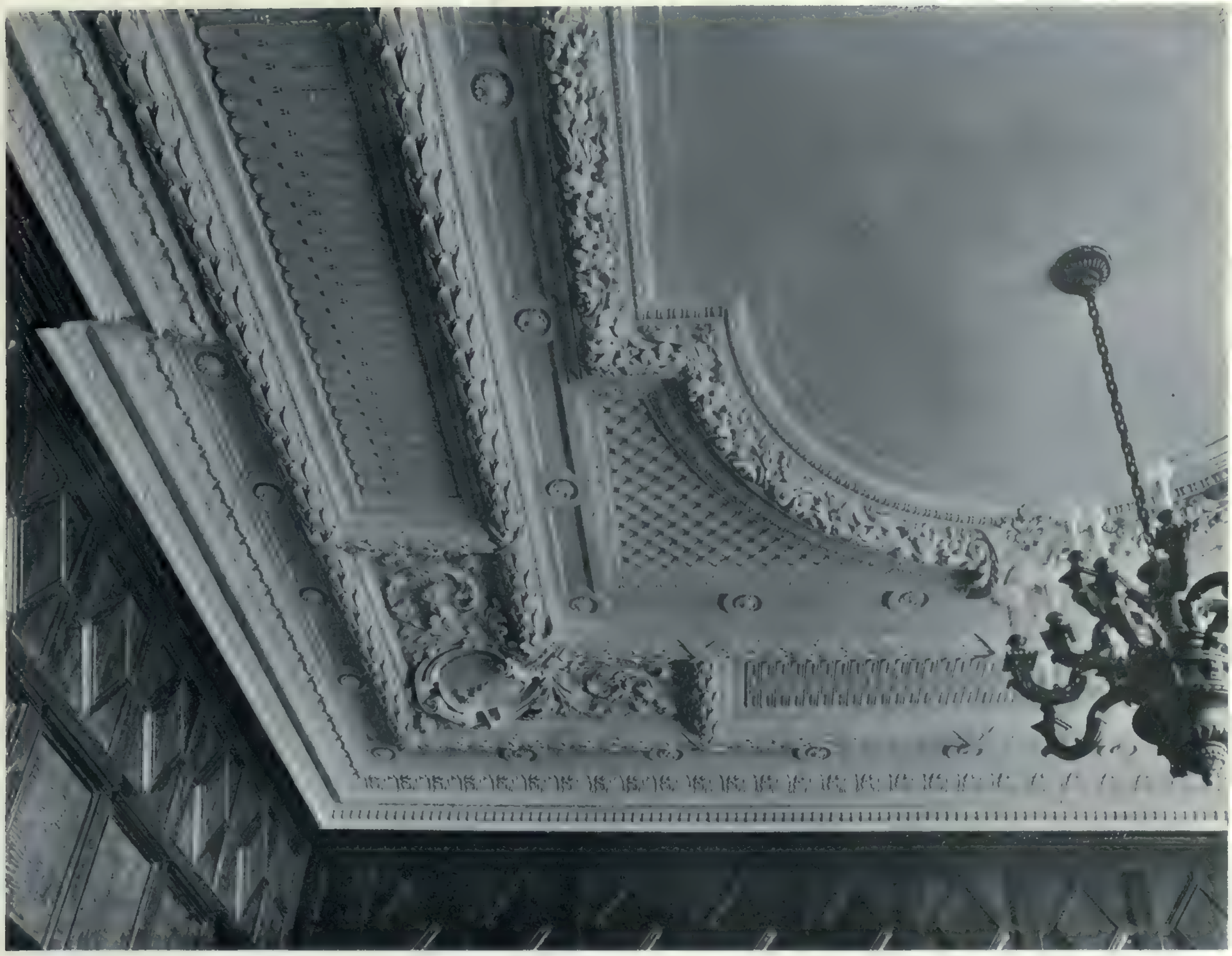
All floors from the second to the eighth are divided into offices to suit the wishes of the tenants. The corridors are wide, protected by a marble wainscot having a broad strip for the cap and base with a very slight projection. The floors are of marble slabs eight by sixteen inches

HEAD OFFICE ON NINTH FLOOR.



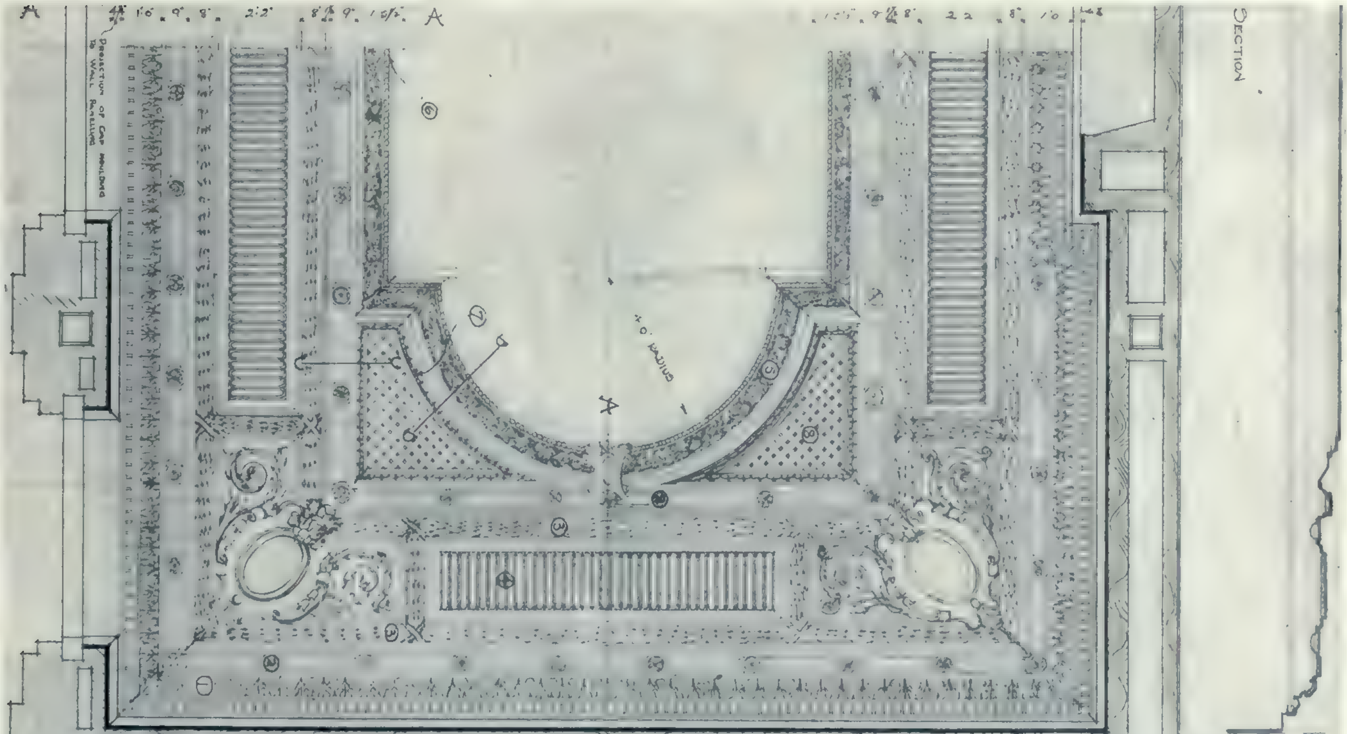
BOARD ROOM IN THE DOMINION BANK BUILDING, TORONTO, CAN.

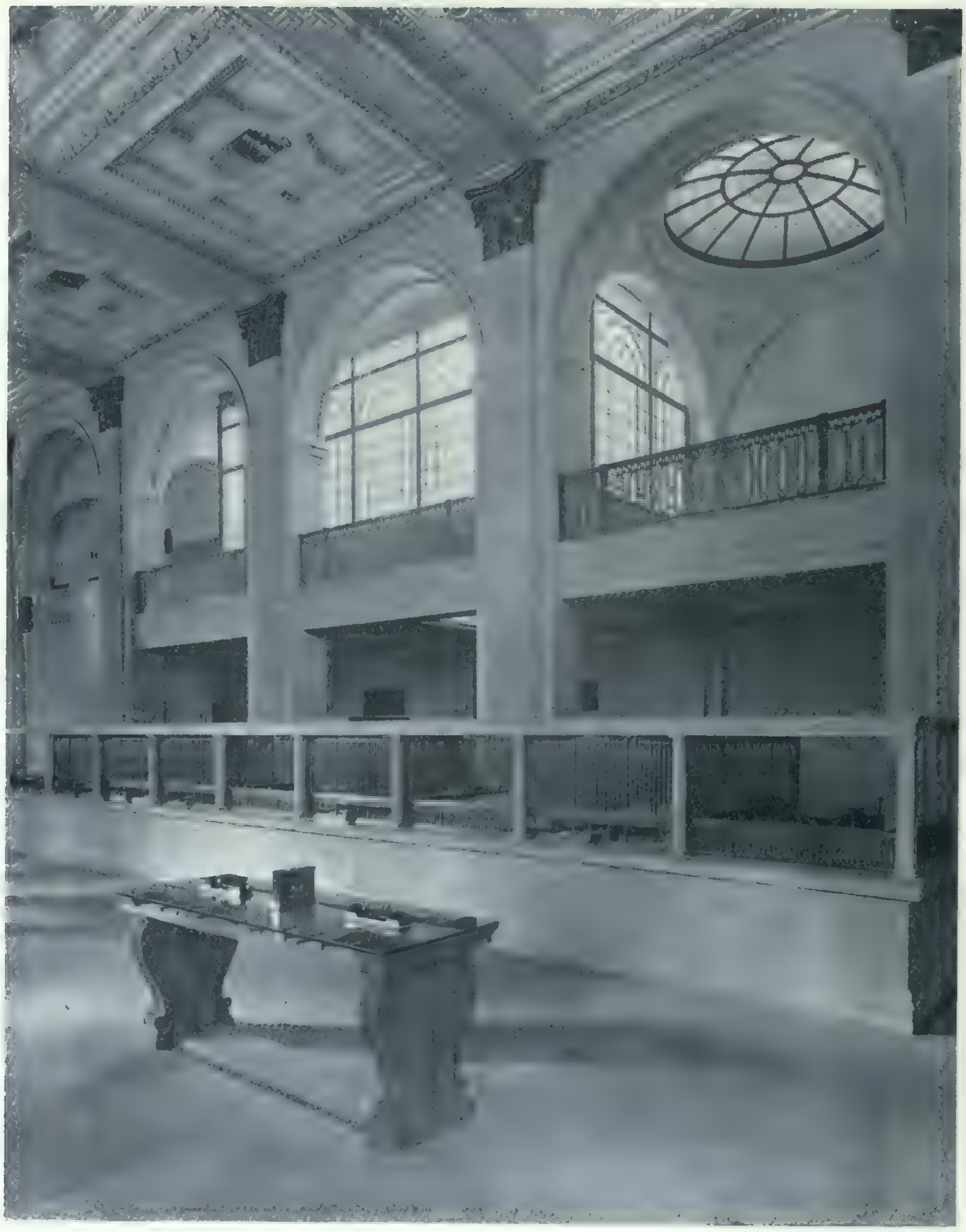
DARLING & PEARSON, ARCHITECTS.



PLAN OF CEILING IN BOARD ROOM, DOMINION BANK BUILDING, TORONTO.

DARLING & PEARSON, ARCHITECTS.





DETAIL OF MAIN BANKING ROOM.

in size; the walls and ceilings of cream tinted plaster; the doors and trim of hollow metal. A battery of four fireproof vaults are located on each floor for the benefit of the people renting space. The offices have inner doors of mahogany, each provided with a bronze ventilating grille in the lower panel. A noted feature of the construction is found in the windows, each one of which unlocks out of its frame by means of a simple mechanism and permits of thorough cleaning from within the building.

The head office of the Dominion Bank is found on the ninth floor. Here is transacted all the business of the institution in relation to its branches scattered throughout the Dominion. Leading from the elevator hall is a large public space constituting one end of the head office and situated under the mezzanine gallery running around the large lofty room some twenty-two feet high. This main office measures seventy by twenty-eight feet; has all woodwork, including pilasters, door trims, and furniture in fumed oak; lighting fixtures finished in a dull bronze; and floors in squares of cork. Overhead is one long double skylight covering practically the whole room, with cold rolled copper containing corrugated wired glass amply protected by mineral wool. The walls are finished in plaster, painted a light shade of green and brought into harmony with the whole color effect; the skylight being also tinted in a pale greenish hue. On the mezzanine floor is located the stenographical department, directly under which are private offices extending along both sides.

SAVINGS BANK DEPARTMENT.

The private offices are fitted up with every convenience, having seamless imported Wilton rugs either of a Kurdistan, Kirmanshah or a Feraghan design, with colors varying from old rose, deep reds and grey to bright yellows and terra cotta. All pieces of furni-

DETAIL OF FIRST MEZZANINE FLOOR.

ture in each office, including desk, clothes press, filing case and drawers, possess the same style of lock, so that one key opens the complete outfit. At the side of the desk is a small plate with a very slight projection which eliminates the general push button and permits the concealment of all wires. In place of the large annunciating outfits used for messenger service, etc., are small compact cases one foot square, having forty-five small lights and a place beneath for the name of the person whom the flash represents.

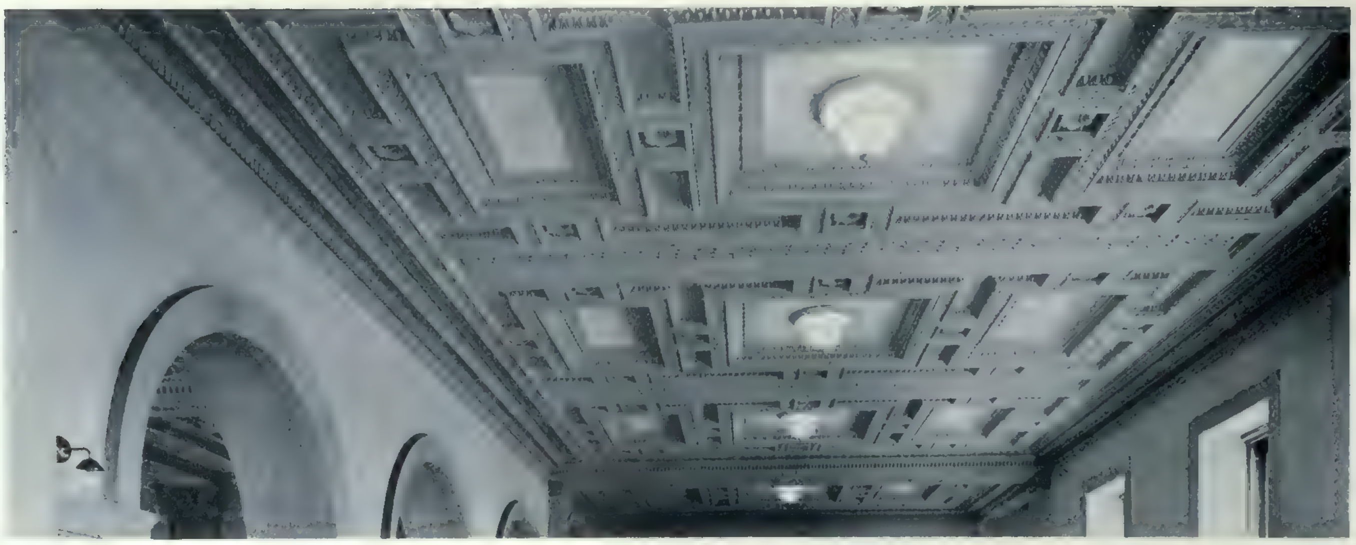
On this floor is built a vault for the protection of all records in connection with the various branch offices. Along the walls are steel files with shelves adjustable every inch and partitions which can be placed to suit any required division of spacing. The ventilating door is connected to the main door by a solid rod so that it is impossible to leave the one open when the other is closed. Another room is arranged as a drafting department to take care of minor work in connection with the building.

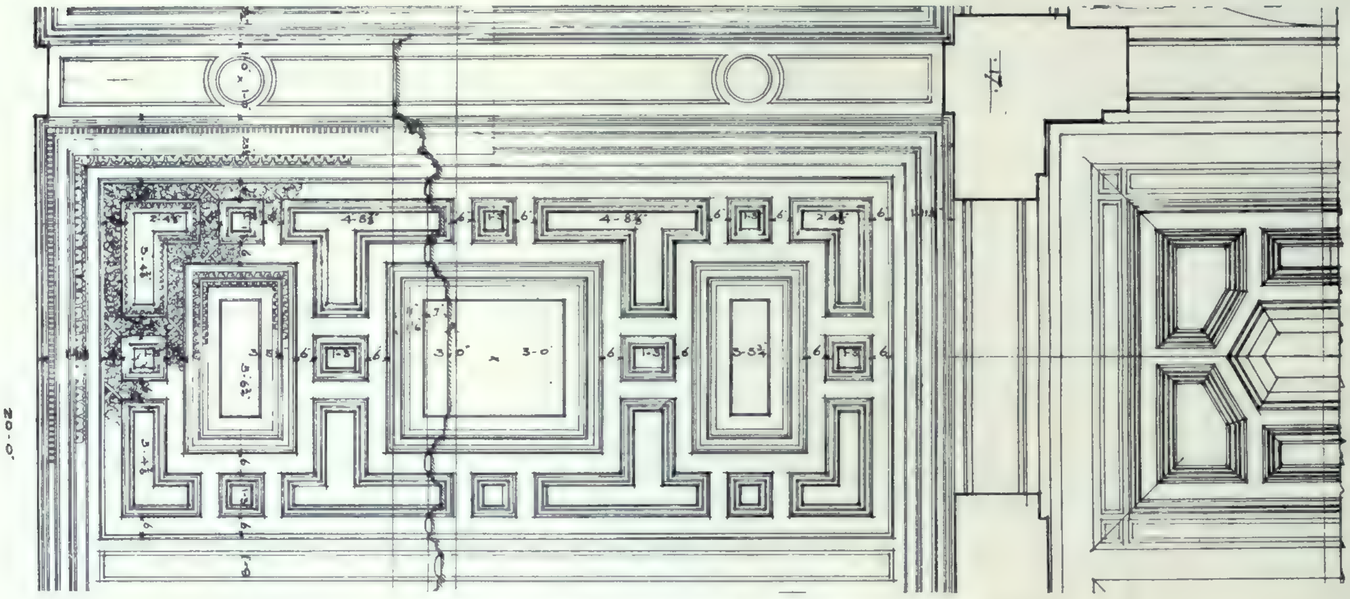
At the north end of the head office is planned the stockholders' room, with wood panelling to the top of the mezzanine balustrade enclosing it on three sides. A large central lighting fixture hangs suspended by a dull bronze chain, equipped with one central bowl and six globes encircling it. One side of the room opens into a library, the other into a room fitted up for the use of out of town guests.

The southern portion of the ninth floor is devoted to the general manager, board room and elevator hall. Entering the general manager's suite either from the board room or public space, we find his private quarters richly decorated in walnut woodwork and florid tapestry of dull warm colors. The mantel carries out the general effect with its black and white marble; while the lighting fixtures of dull bronze wall brackets and frosted chandelier are also expressive of the quiet and dignified treatment throughout. Another of the bank's ingenious devices should be observed in connection with the manager's office. An interior telephone system has been installed which connects all departments. The manager, by pressing down a series of levers built into his desk, can communicate with all the heads of departments at one time. This action is taken without the use of a receiver by means of two large openings above the row of levers; and should he desire not to have the conversation overheard by others in the room, he uses the receiver, which in turn disconnects the open annunciator.

Adjoining the manager's room is the board room, the most elaborately designed part of the bank. The walls are panelled to the ceiling in natural walnut; the hardwood floor is covered with a heavy hand tufted Donegal rug with a

GENERAL MANAGER'S OFFICE.





DETAIL OF MEZZANINE CEILING, NORTH AND SOUTH ENDS OF BANKING ROOM.

blue centre and three-foot border of patterned design in browns, greys and greens. At either end are two doorways with delicately carved consoles supporting pediments; while in the centre of one side is an attractive fireplace of purplish grey Formosa marble with a tapestry brick lining and hearth of square tiling. The ceiling consists of an elaborate design after the Renaissance period, lending a striking effect to the tout ensemble. All the relief work leads from the acanthus scroll in each corner up to the inside border of sharply cut flowers, fruit and

DETAIL IN SAVINGS BANK DEPARTMENT.

OFFICIALS' PLATFORM ON MAIN FLOOR.

vegetables, enclosing a plain field utilized for the hanging of two unusually well moulded lighting fixtures, each possessing fourteen candle lights. A large table occupies the central part of the room with the top finished in a deep green leather; the chairs also being upholstered in the same material.

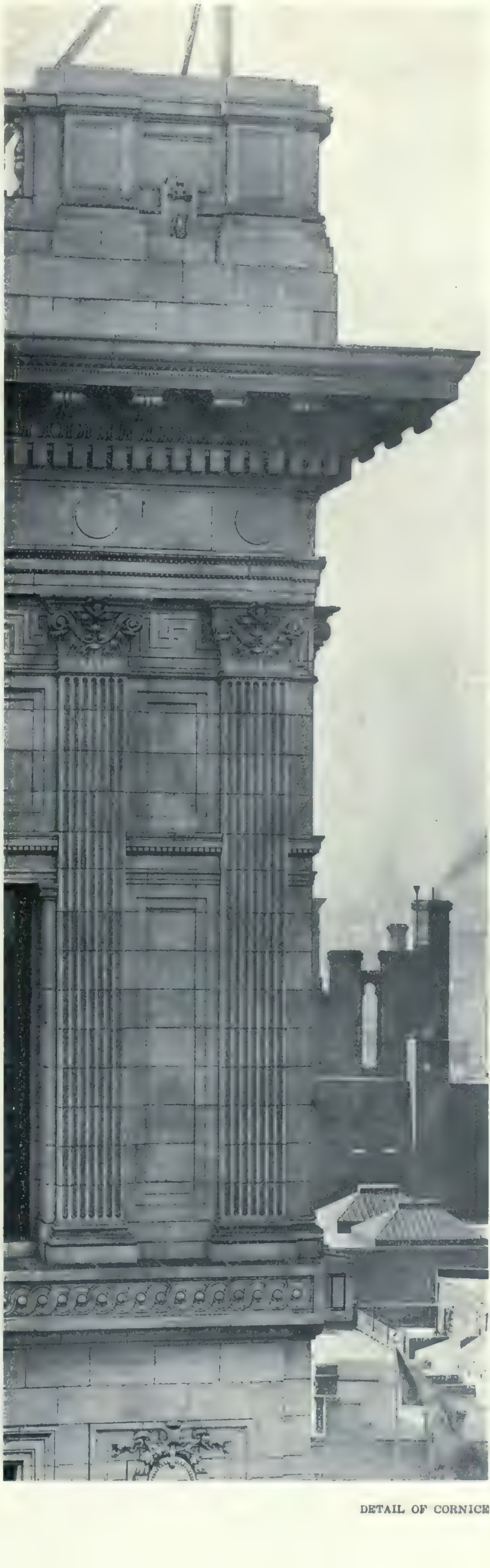
The Vaults.

To the visitor a very attractive feature of the building is the great vault which is the largest as well as the best equipped in Canada. The approach is by the broad marble stairway leading from the savings bank department down to the public space separated from the vault lobby by a massive steel grille with bars one and one-half inches thick, spaced four inches on centres, and reaching from the floor to ceiling. The vault is erected entirely separate from the building construction; approximately thirty-three feet square by twenty-five feet high; divided into two stories, the upper or safe deposit vault, the lower or treasury vault.

Surrounding the vault is a patrol passage three feet in width. At the corners are placed heavy silvered glass mirrors, full depth, and set at such an angle as to permit of free observation on all sides; while similar arrangements have been made above and below, so that no exposed surface escapes the attention of the guard. Lights with silvered reflectors are arranged by means of removable parts so that the entire length of the observation space is well illuminated. Even the bottom of the vault is constructed in such a manner as to remove all possibility of tunneling. Upon the solid rock-bed eighteen-inch steel beams encased in concrete form a series of piers which support the vault and at the same time permit an unobstructed view of all open space beneath.

Directly over the observation tunnels just mentioned is a twenty-eight inch floor construction consisting of reinforced concrete, closely staggered iron grillage, two and one-half inch steel lining, and tile laid upon a cement base. The walls also are similar in thickness to the floor, built up of two and one-half inches of shock and drill-proof steel surrounded by two feet of rock concrete. This concrete is made impervious to fire, shocks and acid applications by having two rows of heavy steel beams embedded within. The entire outside surface of laminated lining is waterproofed by two layers of heavy tar paper with applications of hot tar on both sides.

To enter the safe deposit vault it is necessary to pass through one of the largest and heaviest doors ever built. It is circular in shape, two and one-half feet thick, weighs more than thirty tons, and has a clear opening of seven feet six inches in diameter. The door guarding the treasury vault below is of the same thickness



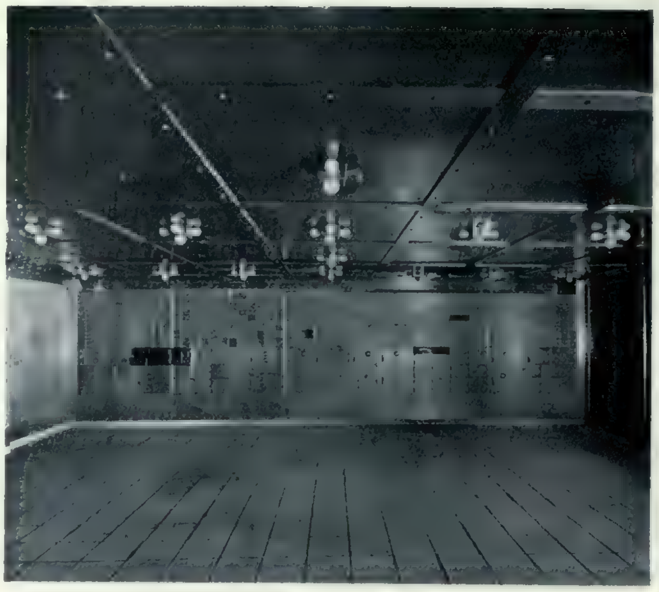
DETAIL OF CORNICE.

and construction, but rectangular in shape. The doors are of composite construction, the outer half formed of low steel castings containing ten inches of concrete; interlaced refractory steel members one and one-half inches in diameter, four inches on centres; and a cutter burner proof metallic section. The inner half is built up of seven parts each of two inch thickness firmly welded together; three layers of five-ply chrome steel plates; four layers of low steel, and solid cast steel bolt frames. With the exception of two narrow rebates, there is no short stepping and no customary tongues and grooves.

A feature of unusual interest is the locating of the combination locks and bolt-throwing mechanism on the door jambs and the time locks upon the doors proper. Such an arrangement necessitates the putting of holes through both the jamb and the door in order to reach the dogging devices in burglar operations and provides doors solid and without spindle holes. All locks and bolt-throwing mechanism are covered with heavy steel plates. The combination dial is in the shape of a steel cylinder disappearing angle-wise in the top of the front pressure housings. The front end is provided with an oval glass window, behind which appears an electrically illuminated dial with two revolving pointers which are connected with operating knobs located on the side of the housing, used to set the combinations of the locks. The device is not only one of convenience, as the cylinder is located upon a normal line of vision, but absolutely prevents any unauthorized observation of the setting up of the combination numbers.

STEEL GRILLE IN FRONT OF SAFETY VAULT.

The doors are hung upon massive steel crane hinges provided with ball and roller bearings and so carefully balanced that they are easily manipulated. They are steam tight and locked with a train of twenty holding bolts, four and one-half inches in diameter. The bolt work is covered with sections of French plate glass, at the centre of which is a circular glass door fifteen inches in diameter. The outside ring of glass is one piece without radial frames, set with a grey invisible packing.



INTERIOR OF SAFETY DEPOSIT VAULT.

A special foundation of concrete has been set in front of the entrances for the support of the mechanism, whereby sections of the floor are dropped by the use of a hand lever to permit the opening and closing of the doors and then raised and locked in position to complete the floor levels.

Electric protection has been installed so that in case any attempt has been made to drill through the walls or doors, or should the doors be opened in any unauthorized way, three large gongs sound an alarm, one being located upon the exterior and two upon the interior.

The safety deposit vault is equipped with more than a thousand boxes of various sizes, finished in polished steel, locked with the latest interchangeable key locks, and provided with an enamelled bond drawer. The vault has a polished steel grille and gate located directly within the main vault entrance. The floor is tiled with marble slabs, the joints being "struck" with monel metal bars; the walls and ceilings are panelled with steel plates and bars; the lighting is furnished by a double system of electric equipment so arranged that the vault cannot be thrown into darkness by anyone except the proper officials.

Within the vault is a telephone which allows a means of outside communication by any person accidentally locked in at night time. If such an accident should occur the prisoner will find a pair of lights burning and a card of instructions advising whom to call and how to release the time lock devices, after which the combinations can be operated. Large volumes of fresh air is constantly delivered into the vault, the circulation of which is augmented by fans.

Mechanical Equipment, Dominion Bank Building

MELVERN F. THOMAS, M. M. E.

THIS installation was designed to meet the complex requirements of a modern office building, including within its walls the home of a large banking institution.

The boiler and engine rooms occupy the north end of the second basement, which is about 28 feet below the level of the street. The rooms are large and allow ample space for inspecting and operating the equipment in a satisfactory manner. The boiler room has a plain concrete floor, with ceiling and walls plastered and painted, and the engine room has a tile floor and enamel brick walls.

The steam generating plant has a rated capacity of 558 horse-power, and consists of three equal units of the Erie City vertical water-tube type of boiler. The Government inspectors allow a working pressure of 160 lbs. per square inch, but the plant is operated at a pressure of 125 lbs. Fig. I gives a view of the front of the boiler room, and shows the stokers, the coal hoppers and chutes, the ash trolley, and the boilers in the background.

These boilers consist of two horizontal drums, connected by vertical water tubes, and the design and construction give good circulation and allow easy access to all surfaces for cleaning, both interior and exterior. Tile baffles are arranged so that the gases from the furnace must pass successively over three groups of tubes before reaching the outlet to the chimney. The feed water and blow down pipes are connected to the bottom drum, and the steam pipe and safety valves are connected to the upper one. The boilers and stokers are enclosed in brick, and the entire setting covered with a 3-16 inch steel casing.

The boilers are equipped with chain grate stokers, which consume the cheapest grades of bituminous coal screenings without producing smoke. The arch over the fire near the front is very low, and this portion of the furnace acts as a gas retort by distilling off the gases and making coke. The arch over the back of the furnace is high and gives a large combustion chamber, into which the gases flow and burn, while the coke is slowly carried into this part of the furnace and also consumed. The depth of the fire upon the grate is regulated by a hand operated gate, and the rate of travel of the grate is regu-

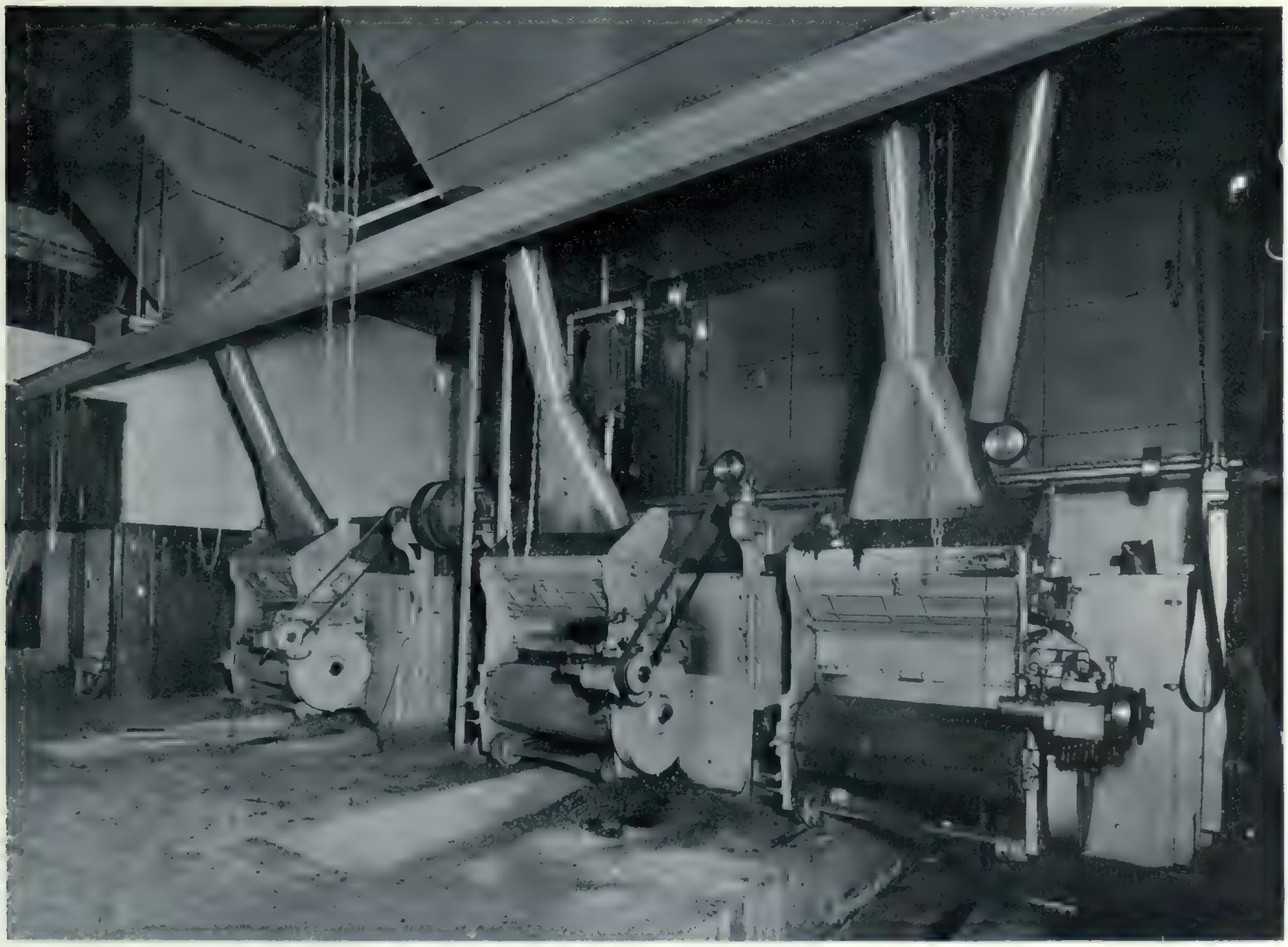


FIGURE I. VIEW OF BOILER ROOM.

lated by shifting gears. These gears are entirely enclosed and run in oil. Dampers are provided to cut off the air from the back section of the grate, and thus prevent the loss due to a heavy excess of air passing through the back of the grate when operating on a small load.

Two small steam engines are provided to operate the stokers. One of them is a reserve.

Draft is supplied by a steel chimney extending up through the building to a height of about 225 feet above the furnace grates. The boilers are connected to the chimney by a steel flue, and both chimney and flue are lined with vitrified asbestos, which reduces the radiation to a minimum. An automatic hydraulic damper regulator controls the main damper in the flue, and reduces the draft on the furnaces when the steam pressure rises above 125 lbs. per square inch, and makes the full draft effective when the steam pressure is reduced.

A coal bin having a capacity of over four hundred tons is located near the boiler room, and coal is delivered into it through four openings in the Yonge street sidewalk. A complete coal handling equipment is provided to reclaim the coal from the bottom of the bin and deliver it to steel hoppers having a capacity of eighteen tons located above the furnaces, as shown in Fig. I. From the hoppers the coal flows by gravity down chutes to the furnaces. This conveying equipment is operated by a 10 h.p. motor.

The ashes and refuse from the furnaces are dumped into small steel cars and handled by a chain hoist and trolley to the ash room. A chain bucket elevator in the ash room is arranged so that it may be raised through doors in the sidewalk and discharge the ashes directly into wagons on the street.

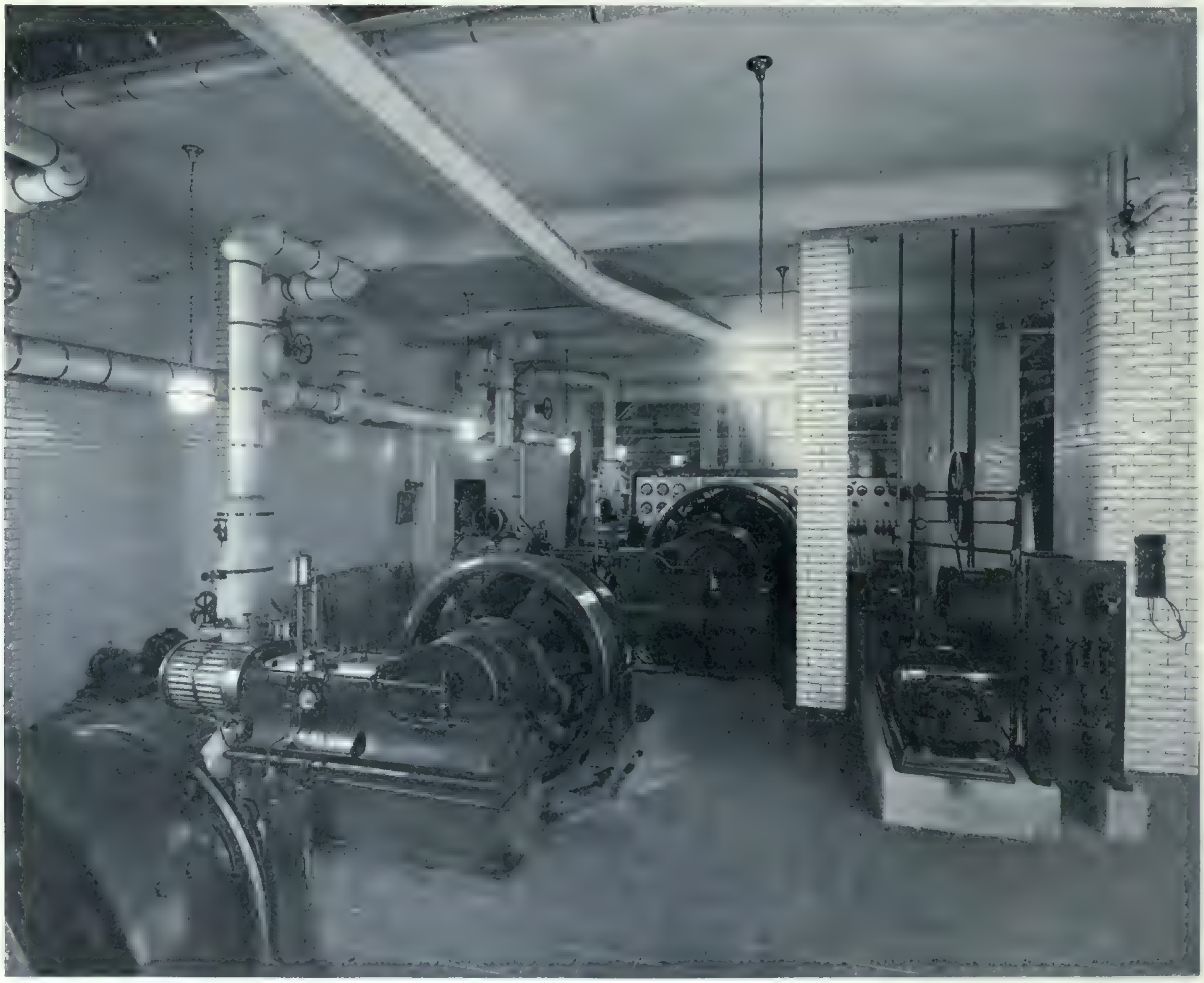


FIGURE II. VIEW OF ENGINE ROOM.

Steam from the boilers flows into a high pressure header located above the boilers, and is controlled and distributed to the several services by valves and branches connected to this header. Extra heavy triple duty steam valves are flanged directly to the boilers, and will automatically close in the event of a failure of either a boiler or any of the large piping connected to the main steam header. All the piping and

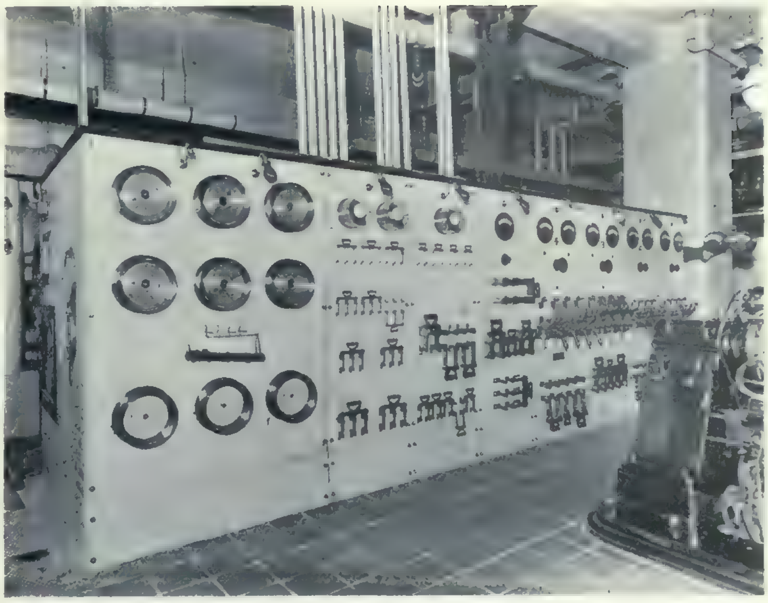


FIGURE III. MAIN SWITCHBOARD.

valves handling high pressure steam are extra heavy. Two branches supply the steam header in the engine room, and valves are provided to cut off a part of the plant in case of accident.

The electric generating plant has a rated capacity of 497 K.W., and consists of two 186 K.W., one 75 K.W. and one 50 K.W. units. Fig. II. shows a view of part of the engine room. The generators are compound wound, have interpoles, and are of the three-wire direct current, 115-230 volt type, with static balancers capable of compensating for a 25 per cent. unbalance of the load. These machines are designed to carry full load continuously with a temperature rise not to exceed 35 deg. C., to carry 50 per cent. overload safely for two hours, and to withstand a momentary overload of 100 per cent. Heavy duty non-condensing engines are direct connected to these generators, and the large units operate at 200 R.P.M. and the small ones at 275 and 290 R.P.M. One of the large units is operated during the day shift, and furnishes current for power, including the elevators and for lighting.

Low tension current for the operation of the fire alarm, the emergency vault lights, and all the call bells in the building is furnished by two direct current motor-generator sets, each having a capacity of 50 amperes at 20 volt. There are also two storage batteries, each having a capacity of 200 ampere hours on the eight-hour rating, which are operated in conjunction with the motor-generator.

Fig. III. shows the main switchboard located in the engine room. The pressure gauge panel is mounted as an extension of the switchboard. The entire board is constructed of white Italian marble two inches thick, and is 21 feet long by 7 1-2 feet high. The equipment of the board contains all necessary instruments, and switches to control the generating equipment and the distribution of the current to the various service panels throughout the building. The power circuits distribute 230 volt current to panel boards, from which branches extend to the motors operating the various services. The lighting is operated upon a three-wire system from the switchboard to the distribution panels, where the branch circuits are balanced between the neutral bus bar and the positive and the negative buses.

There are 31 motors, having an aggregate of 528 horse-power, in the building, and there are about 1,400 lighting outlets including the receptacles in the base boards. All of the wiring for lighting and power, and the greater part of the low tension and telephone circuits are enclosed in steel conduits, in accordance with the Underwriters' rules for the highest class of construction.

Steam for heating is distributed through an overhead system, consisting of mains in the attic and risers in the walls of the building. All of the building except the savings department on the ground floor and the main banking room is heated by 17,000 square feet of direct steam radiation, operated on a vacuum system. All offices have the temperature automatically controlled by vapor disc thermostats located upon interior walls or columns and operating the diaphram steam inlet valves on the radiators. The drain connection to each radiator is equipped with a vapor disc type of thermostatic trap, which allows all water and air to escape to the return piping, but holds all the steam back in the radiator.

Two 8 and 12 x 12 inch vacuum pumps, shown

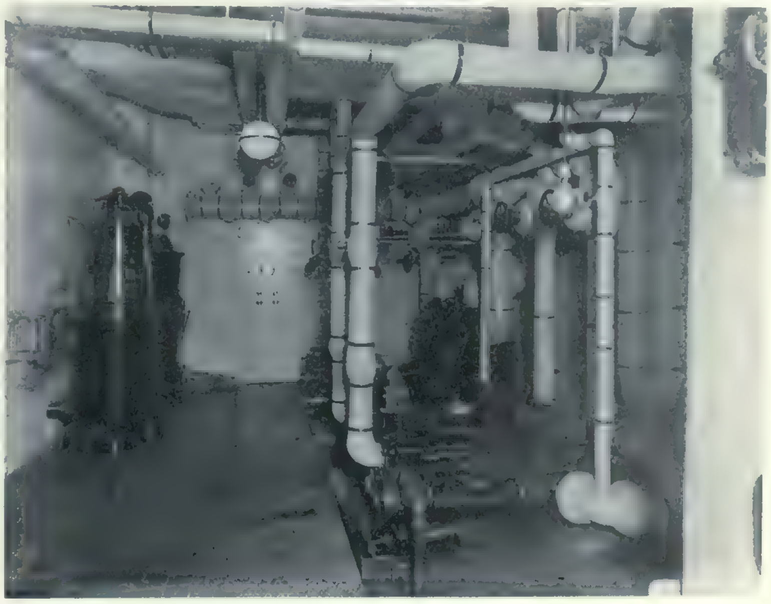
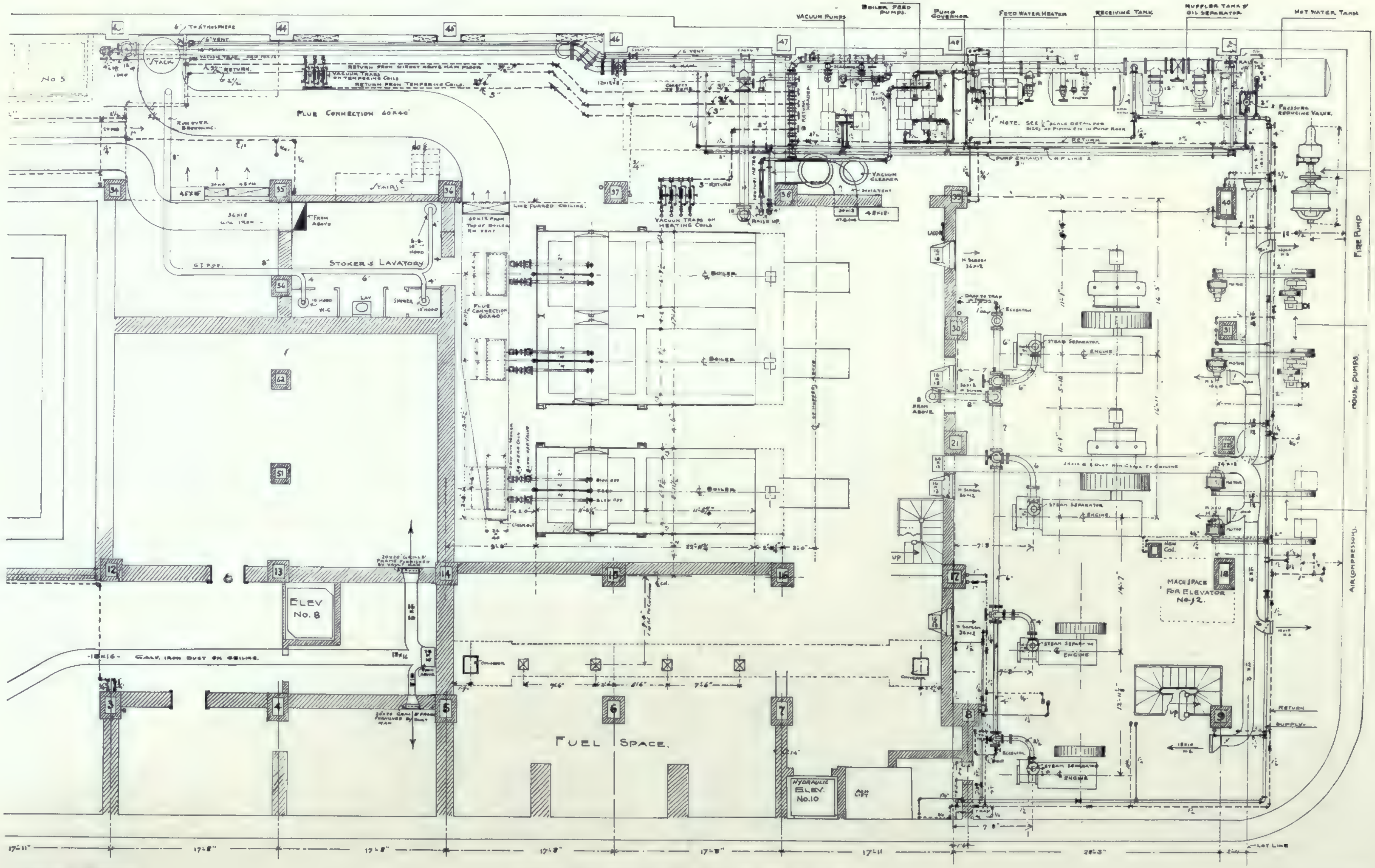


FIGURE IV. VACUUM CLEANER, BOILER FEED AND HOUSE PUMP.

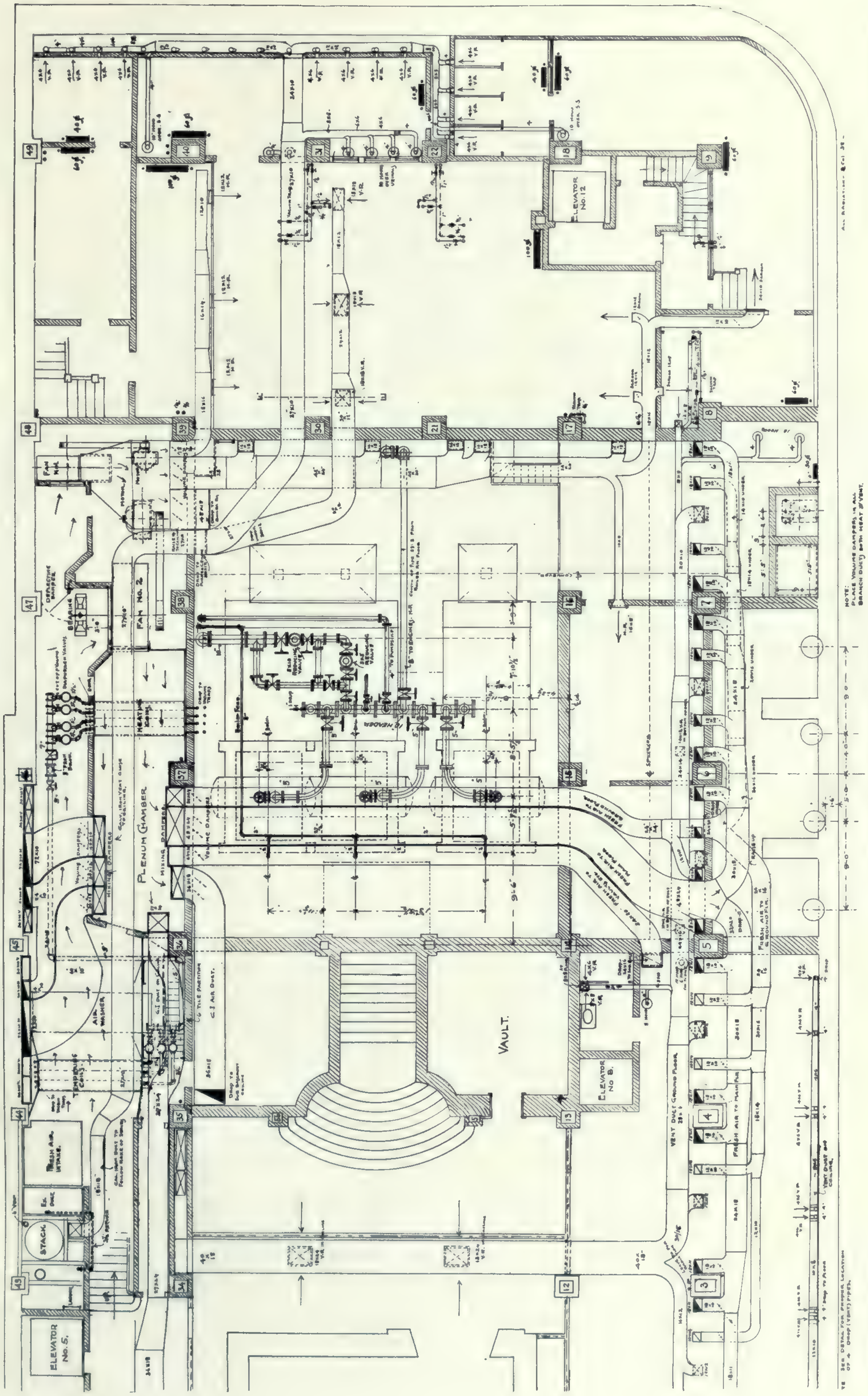


DARLING & PEARSON, ARCHITECTS.

HEATING AND VENTILATION, SUB-BASEMENT FLOOR PLAN.

DOMINION BANK BUILDING, TORONTO.

JAS. MCALEAR, CONSULTING ENGINEER.



JAS. McALEAR, CONSULTING ENGINEER.

HEATING AND VENTILATION, BASEMENT FLOOR PLAN.

DOMINION BANK BUILDING, TORONTO.

DARLING & PEARSON, ARCHITECTS.

in Fig. IV, return all condensation to the receiving tank or to the feed water heater.

The savings department and main floor are heated by warm air, which is brought down from the court and passed successively through the tempering heater, which raises the temperature to 60 deg. F. through the air washes, which removes all dust and odors and partially controls the humidity, and to a fan which forces it through a by-pass into the tempered air chamber or through the reheater, which raise the temperature to 80 or 100°, as required to heat the rooms, and into the hot air chamber. From the air chambers galvanized iron ducts lead to the rooms, and mixing dampers under the control of thermostats in the rooms give the necessary amount of hot and tempered air to maintain the desired temperature. The combined heating surface of the tempering heater and the reheater amounts to 5,100 square feet.

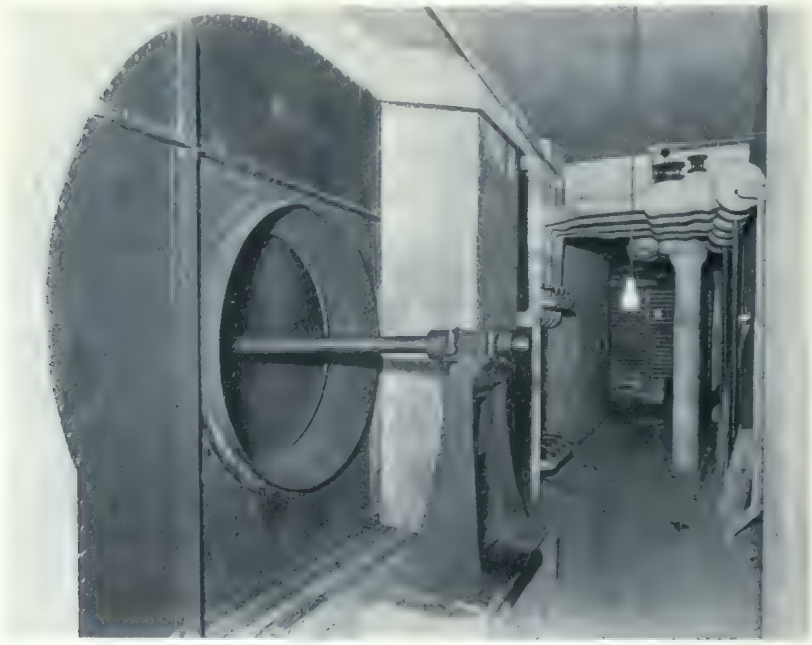


FIGURE V. VENTILATING AIR PASSAGE.

Fig. V shows the passage from the air washer to the main fresh air fan. This fan has a capacity of 45,000 cubic feet of air per minute and the air washer and tempering heater have capacities of 60,000 cubic feet per minute. They also supply air for the engine and boiler room. The fan supplying air to these rooms has a capacity of 20,000 cubic feet of air per minute.

Air is exhausted from the basement, the savings department, the main banking room, from the kitchen and dining-rooms and from all the toilet rooms by five exhaust fans having an aggregate capacity of 68,000 cubic feet of air per minute.

The fans are all operated by 230 volt direct current motors equipped with compound controllers to give 50 per cent. reduction in speed or to increase the speed 25 per cent. above the normal. Fig. VI shows two small exhaust fans used to remove air from the kitchen and from a toilet room in the attic.

A supply of compressed air for operating the elevator gates, for the sewage ejectors, for operating the temperature controlling equipment, and for blowing out armatures, is furnished by two 100 ft. capacity compressors belted to 15 h.p. motors. The distance between centres of belt pulleys on these drives is only four feet, but a swinging arm gravity idler pulley gives the desired arc of contact for the belt upon the motor pulley and entirely eliminates the unsteady operation of belts driving such machines as compressors.

The air from the compressor is discharged into a storage tank and automatic controllers start and stop the motors and maintain a pressure between forty and fifty pounds per square inch.

Provision is made for vacuum cleaning throughout the entire building. The machine, shown in Fig. IV, consists of a multistage centrifugal turbine exhauster direct connected to a 15 h.p. vertical shaft motor. This equipment operates at a speed of 3,400 r.p.m., produces a vacuum equivalent to five to six inches of mercury column, and has a capacity of six sweepers, each exhausting one hundred cubic feet per minute. Mains and risers extend from the machine to the inlet valves, which are distributed three on each floor of the building. With the machine operating at the rated capacity and fifty feet of hose a vacuum equivalent to two to three inches of mercury column is obtained when the tool is in service.

A pneumatic tube system is provided to transmit messages between the offices of the bank.

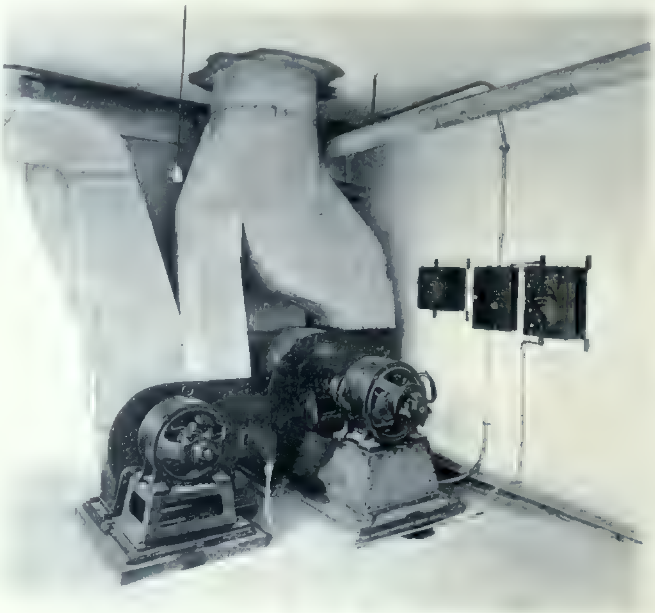


FIGURE VI. SMALL EXHAUST FANS.

A blower and an exhauster supply power for transmitting carriers. Both machines consist of single stage centrifugal fans direct connected to 10 h.p. motors and operate at 3,500 r.p.m. against a difference in pressure of about one pound per square inch. These machines are shown in Fig. VII. The carriers for this system are fourteen inches long and the tube in which they travel has three by six inch oval section. The air valves used to operate the system for dispatching the carriers are operated by solenoids controlled by push button switches. There are two central stations, one on the tenth floor and the other in the sub-basement, through which the carriers are dispatched.

A two-ton ammonia compressor belted to a 5 h.p. motor furnishes refrigeration for cooling boxes in the kitchen on the eighth floor, in the janitor's quarters, in the attic and in a florist's shop on the ground floor. Ammonia is piped direct to the boxes and refrigeration is accomplished by cooling and congealing coils and brine tanks. The refrigerating machine and the condenser are shown in the long sub-basement corridor, Fig. VII.

Schedule of Toilet Fixtures.

	W.C.'s	Lavs.	Urinals.	Slop-sinks.
Sub-basement	2	2	2	1
Basement	22	17	8	5
Ground floor	..	1	..	1
Main floor	1	1	..	2
Mezzanine floor ...	..	..	..	1
Second to seventh, inclusive, each ..	5	3	2	2
Eighth floor	14	17	8	2
Ninth floor	2	3	2	1
Ninth mezzanine ..	..	..	..	1
Attic	2	3	..	1
Total	73	62	37	27

There are 30 toilet rooms in the building, all equipped with the best quality vitreous china and porcelain fixtures with full nickel-plated fittings. The aggregate list of fixtures is 73 water closets, 37 urinals, 62 lavatories, 27 slop sinks, 2 shower baths and 2 bath tubs. Galvanized iron piping is used for all soil and waste lines, and for the rain water leaders. The drainage from the basement and sub-basement flows into two 150-gallon pneumatic ejectors, which operate automatically and discharge the waste material into the sewer. A supply of compressed air for operating this equipment is furnished by a compressor plant described in another part of this article. The sewage from the other parts of the building and the rain water from the roof are discharged directly into the sewers by gravity.

A large storage hot water tank containing a steam coil under thermastatic control is located in the sub-basement, as shown in Fig. VII., and flow and return circulating pipe supply hot water to all the toilet rooms.

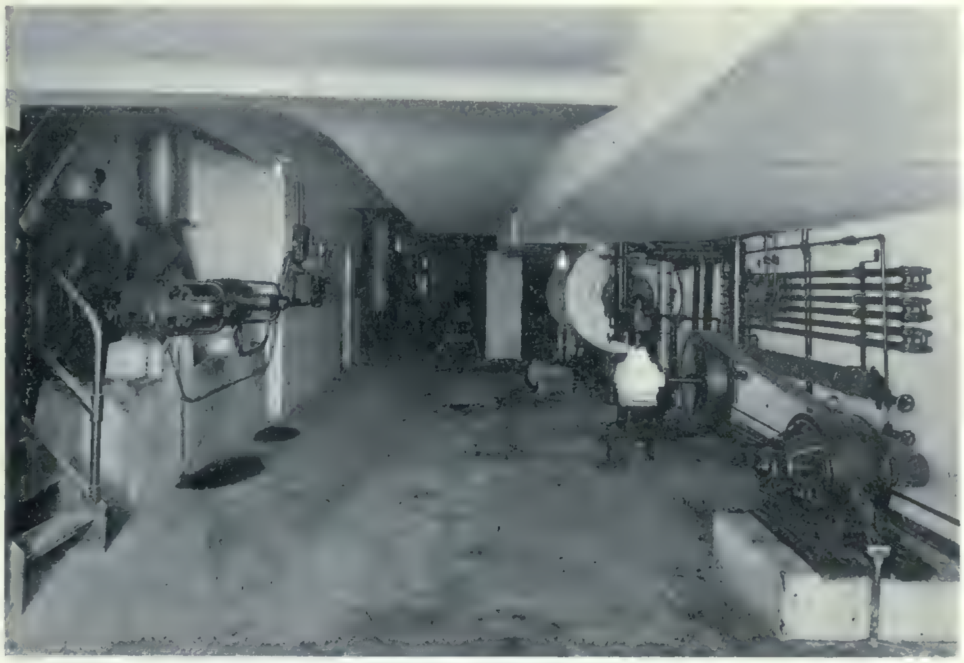


FIGURE VII. PNEUMATIC TUBE AND REFRIGERATING MACHINERY.

All water supplied to the building passes through a mechanical sand filter, and into the building distribution piping, or into the cold water storage tank located in a pent house on the roof. Two 5 x 8 inch triplex pumps operated by 15 h.-p. motors are provided to elevate water to the house tank should the city pressure not be sufficient. This pumping equipment is shown in Fig. VIII.

The seepage water, the blow down from the boilers, the discharge from traps and other waste water is collected in a sump pit below the sub-basement floor, from which it is pumped to the sewers. For this purpose there is provided one 7 1-2 x 5 x 6 inch duplex steam pump, and two 3-inch vertical shaft centrifugal pumps, direct connected to 5 h.-p. motors. The centrifugal pumps are automatically controlled by floats in the pits, which start and stop the motors as the water rises and falls. This equipment is shown in Fig. IX.

The building is equipped with an electric fire alarm system, with stations on all floors, and an alarm gong and annunciator in the engine room. There are fire mains and stand pipes extending through the building, and hose and connections

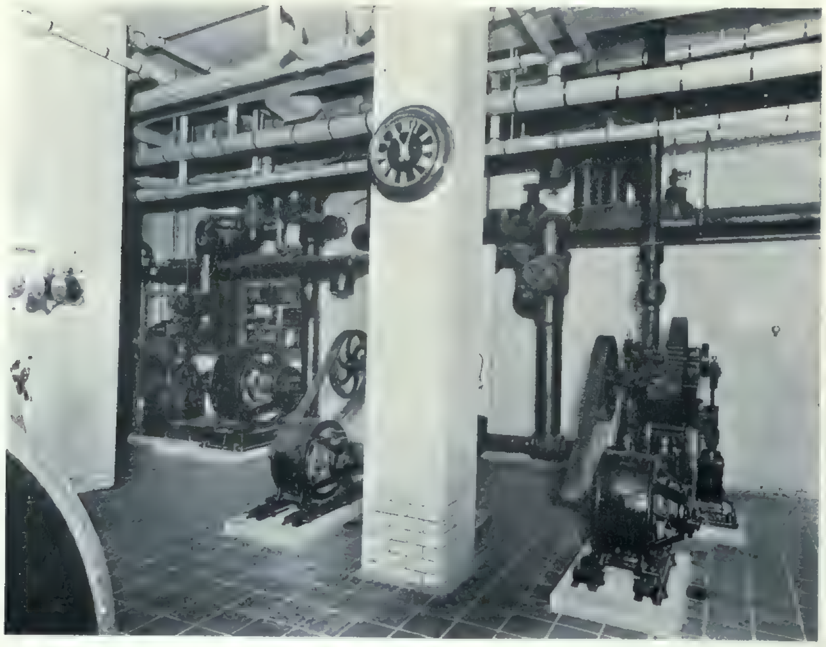


FIGURE VIII. FIRE PUMP AND HOUSE PUMPS.

located upon all floors. A fire pump consisting of a three-stage centrifugal turbine type pump direct connected to a 100 h.-p. motor is located in the engine room, as shown in Fig. VIII. This equipment has a capacity of 750 gallons per minute, and may be put into operation on a moment's notice.

Fig. X shows a part of the kitchen located on the eighth floor, near the three dining rooms where lunches are served to the officers and clerks of the bank. The equipment of the kitchen consists of a combination range and broiler, a steam table, tea and coffee urns and all necessary serving tables, sinks, etc. A large refrigerator opens into the kitchen.

The elevator equipment of the building consists of five high-speed passenger cars, which serve the office part of the building; one slow-speed car serving the main floor from the King street entrance, and three private push-button cars used by the bank in connection with the banking rooms and vault.

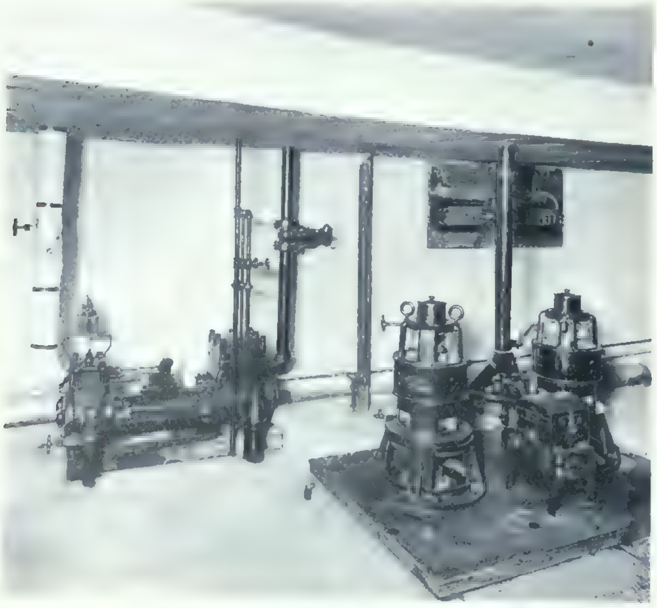


FIGURE IX. SUMP PUMPING EQUIPMENT.

The equipment is of the most modern type, the five main passenger elevators being of the gearless traction type, four of which operate from basement to the ninth mezzanine floor, a distance of 170 feet, and the fifth extending to the sub-basement landing, a total of 184 feet. These elevators have a normal capacity of 2,500 pounds, and travel at a speed of 500 to 550 feet per minute, while the number 2 car is arranged for a safe lifting load of 5,000 pounds at slow speed. These cars are arranged for 1:1 roping, which is the safest, simplest and most efficient method that has been devised for handling high-speed passenger elevators.

The electric traction elevator derives its name from the fact that motion is obtained by means of the traction existing between the driving sheave and the hoisting cables, from one end of which is suspended the car and at the other end the counterweight. Sufficient tractive effort is attained by introducing an idler sheave, which allows a complete loop around the driving sheave, and the resulting service is entirely satisfactory. The machine itself consists essentially of a motor, a traction driving sheave and a magnetically released spring applied brake, all compactly grouped and mounted on a continuous heavy iron bedplate. A slow speed, shunt-wound motor, designed especially for the service, is employed, which has a very high efficiency. The armature shaft, which is of high tensile steel, serves merely as a support for the load, and on it are mounted the brake pulley and driving sheave. The direct drive and consequent elimination of all intermediate gearing between the motor and driving member results in a machine of very high efficiency and absolutely prevents any possibility of vibration or noise which might perhaps occur from the imperfect wearing of a system of gears.

The controller used with these elevators is designed in connection with the motor, and embodies the latest improved application of electro magnet switches, and is actuated by a master switch in the car, giving starting, accelerating, retarding and stopping effects.

Fig. XI. shows the elevator pent house, where the machines operating the five passenger cars are located.

Cams are provided in the hatchway that open contacts one after the other as the car approaches the limits of travel. This feature is entirely independent of the operator in the car, and is effective to stop the car even though the operating devices be left in the full speed position. There are also the usual safety devices, including speed governors, wedge clamp safety device for gripping the rails in case of the car attaining excessive speed, and potential switches, and also the loss of tractive effort, due to decrease in the tension of the cables by either the car or the counterweight striking the oil buffers, a condition peculiar to this method of roping.

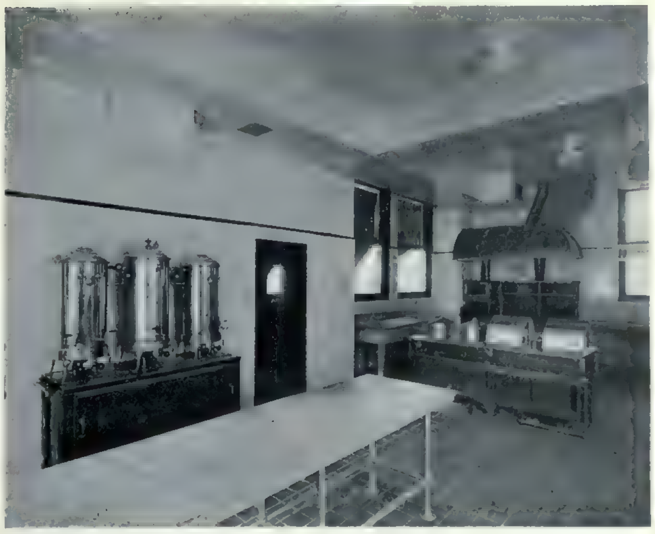


FIGURE X. KITCHEN.

A further feature of security is provided in the oil cushion buffers, which are placed in the hoistway, one under the car and one under the counterweight, and are arranged to bring either the car or the counterweight to a positive stop without injury to passenger.

Additional safety for the travelling public is provided in connection with the elevator hatchway enclosure fronts by making the doors flush with the inside of the walls of the hatchway, to prevent the possibility of clothing catching and causing an accident.

The enclosure doors are operated by pneumatic devices controlled from an attachment in the car, by means of which the doors can be opened or closed by the pressure on a foot button in the floor of the car. Interlocks are also provided, which make it impossible to start the car while any enclosure door is open.

The signal system provided is the very latest type of flashlight signal, both for the operator and the passenger. The passenger pushes a button and one of the signal lanterns in the hall indicates which car will arrive first going in the direction he desires to proceed, and also notifies the elevator operator to stop.

Mechanical dial indicators have been provided at the ground floor, together with a starter's signal to permit the hall man to regulate the movement of the elevators.

Each car is provided with an illuminated threshold, which calls the attention of the passenger to the position of the elevator platform in relation to the floor landing.

The elevator at the King street entrance is of the drum type machine, serving from basement to main floor a travel of 24 ft., having a capacity of 2,500 pounds, and travelling at a speed of 100 ft. per minute. This elevator is for the convenience of the bank customers who desire to ascend from the vestibule landing to the main banking room. This car is equipped with all the usual safety devices installed in connection with modern high grade apparatus of this type, and is provided with an illuminated threshold and pneumatically operated doors.

There are three private automatic push button passenger elevators installed for the use of the bank employees, two of them serving from the sub-basement vault level to the main mezzanine level, a travel of 56 ft., and the third serving from the sub-basement vault level to the ground floor level, a travel of 25 ft. 6 in. These cars have a capacity of 2,000 pounds, and travel at a speed of 100 ft. per minute, and are used for the purpose of inter-communication between the various bank floors, and for the conveyance of the portable money safes and book buggies between the vaults, and tellers' cages and ledgerkeepers' desks.

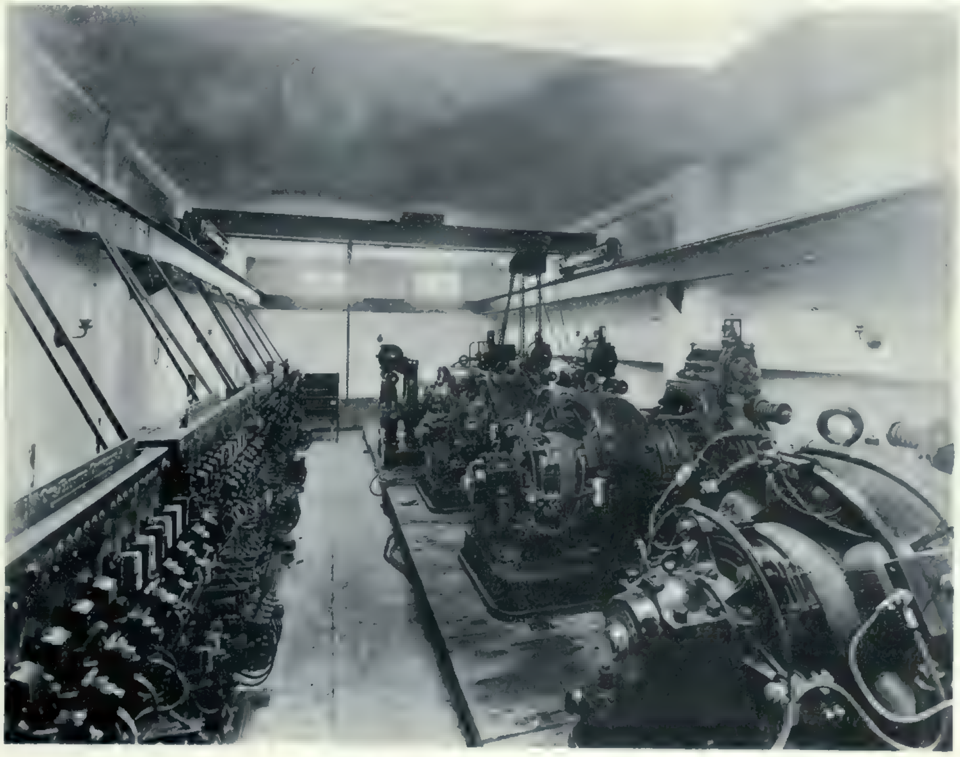


FIGURE XI. ELEVATOR MACHINERY.

These three elevators are equipped with the usual safety devices, and are arranged for automatic push button control, being designed, as their name implies, for use without a regular operator in attendance, their movements being controlled by the passengers or by those who desire their service. At each floor is located a button similar in appearance to the ordinary call bell, which is momentarily pressed by the person wishing the car, and if unoccupied it will start from whatever point it last stopped, come to the proper floor, stop and unlock the door. All doors, excepting the one opposite to which the car stops, are automatically locked. A stop button is provided in case a passenger desires to change the original destination of the elevator after having pressed the button to despatch him to a certain floor.

There are also two sidewalk lifts, serving from 4 ft. above the sidewalk level to the subbasement landing, a distance of 32 ft., one being located on Melinda street, having a capacity of 3,000 pounds, and the other on Yonge street, having a capacity of 1,500 pounds. These machines are both of the hydraulic plunger type, operated from city water pressure, the Melinda street elevator being used principally for incoming or outgoing supplies of the accounting department of the bank, and the Yonge street elevator in connection with the engine and boiler room requirements.

Contractors.

The finished structure, to be successful, must satisfy the critical eye of the contractor, not only in a practical manner but esthetically as well. It is not enough for the manufacturer to see his work represented in the buildings which indicate the wealth and prosperity of a community; he demands in addition the most careful workmanship and pleasing results. In connection with the Dominion Bank, illustrated herewith, we must commend heartily the following companies who have helped to furnish Toronto with a building second to none on the American continent: Canadian Stewart Company, general contractors; Alabastine Hardmortar, Ltd., partition blocks and hard wall plaster; Wm. Bradley & Sons, marble work; Canadian Ice Machine Co., Ltd., refrigeration plant; Canadian H. W. Johns-Manville Co., Ltd., indirect lighting system; W. G. Cornell Co., plumbing; R. C. Dancy, ornamental plaster work; Gent & Co., clocks, installed by Wm. Ashall; Goldie & McCulloch Co., Ltd., book vaults; Gurney Foundry Co., kitchen equipment; W. J. Hynes, Ltd., decorative plaster relief ornament; McDonald & Willson, Ltd., lighting fixtures; W. J. McGuire, Ltd., vacuum system and power plant; Northwestern Terra Cotta Company, terra cotta; A. B. Ormsby Co., Ltd., revolving doors, metal doors and trim, fireproof windows; Otis-Fensom Elevator Co., Ltd., elevators; Reliance Ball Bearing Door Hanger Co., door hangers; Sheldons Ltd., ventilating fans; J. & J. Taylor, Ltd., vault equipment; Toronto Plate Glass Co., window glass.

* * *

AT the annual general meeting of the Saskatchewan Association of Architects held in Saskatoon recently, the following officers were elected: President, W. G. Van Egmond, Regina; vice-presidents, A. G. Creighton of Prince Albert and D. Webster of Saskatoon; secretary-treasurer, F. Chapman Clemesha, Regina; Professor Greig, Saskatoon; R. M. Thompson, Saskatoon; R. G. Bunyard, Moose Jaw; examination board: A. R. Greig, Saskatoon, chairman; R. M. Thompson, Saskatoon; H. Cooper, Saskatoon; F. C. Clemesha, Regina; T. Brammal Daniel, Saskatoon, Secretary.

Mr. Van Egmond in presenting the president's address spoke of the accomplishments of the Association, referring to the improvement of conditions, regulating public competitions. In commenting on the building prospects, he said: "We are looking forward with confidence to a successful termination of the war and ultimately even greater prosperity in the future than we have enjoyed in the past. And while mentioning the war, I want to ask you, gentlemen, to do our share as an Association, and at this meeting vote a substantial donation to the Canadian Patriotic Fund." The suggestion was followed by subscribing $100 to this fund.

After a discussion of the architectural library —during which a list of desirable books was presented, the meeting authorized the Council to spend $600 for that purpose.

* * *

ARCHITEC-TONICS, the Tales of Tom Thumtack, Architect, is the title of an unusually interesting book published by Wm. T. Comstock Company, New York City. This is the first time that architects can claim to have recognized literature in the field of fiction. We have stories about millionaires, manufacturers, all kinds of business men, farmers, and quite a little about engineers, but never a word about an architect. Here it is and it is presented with all the taste that an architect is supposed to have. The book consists of a series of tales about his experiences, telling his views of life in little stories, about the things which happen when buildings are built, lived in and torn down, the tales of the office and the architect's views of the client. There is humor and fun and pathos. They are little tales from real life and they are told briskly and with lightheartedness. Nothing since the days of Cruikshank has equalled the cleverness of the illustrative sketches. The book contains one hundred illustrations and cost $1.50 net.

House on Sherbrooke Street, Montreal

PHILIP J. TURNER, Architect

THE considerations which determine the form and plan of a town house are not necessarily the same as those which suggest the form of a country residence. The plan of a town house is concentrated, and its elevation should be of a stately character.

"When we now look at any piece of architecture, external or internal," a recent writer has said, "our first thought is not of the school to which it must be accredited; we do not say, 'Gothic, bah! a classic ah!' but rather, 'Has it an air of completeness, repose, fitness; is there anything which were better extracted, or is there need of anything to fill out the meaning?' "

Is there any garish or crude color effect, any staring self-asserting pattern, any incongruity of line or form, or is all so tempered that the first and lasting impression is of the ample fulfilment of a purpose well-defined and discriminating? Should there be distracting elements, style will not help us to forget and forgive; at best we assume an air of indifference and seek oblivion. The essence of all good work, then, must be harmony in form and color, in the whole and in every detail; a counsel of perfection, perhaps, unattainable it may be, but none the less sought after.

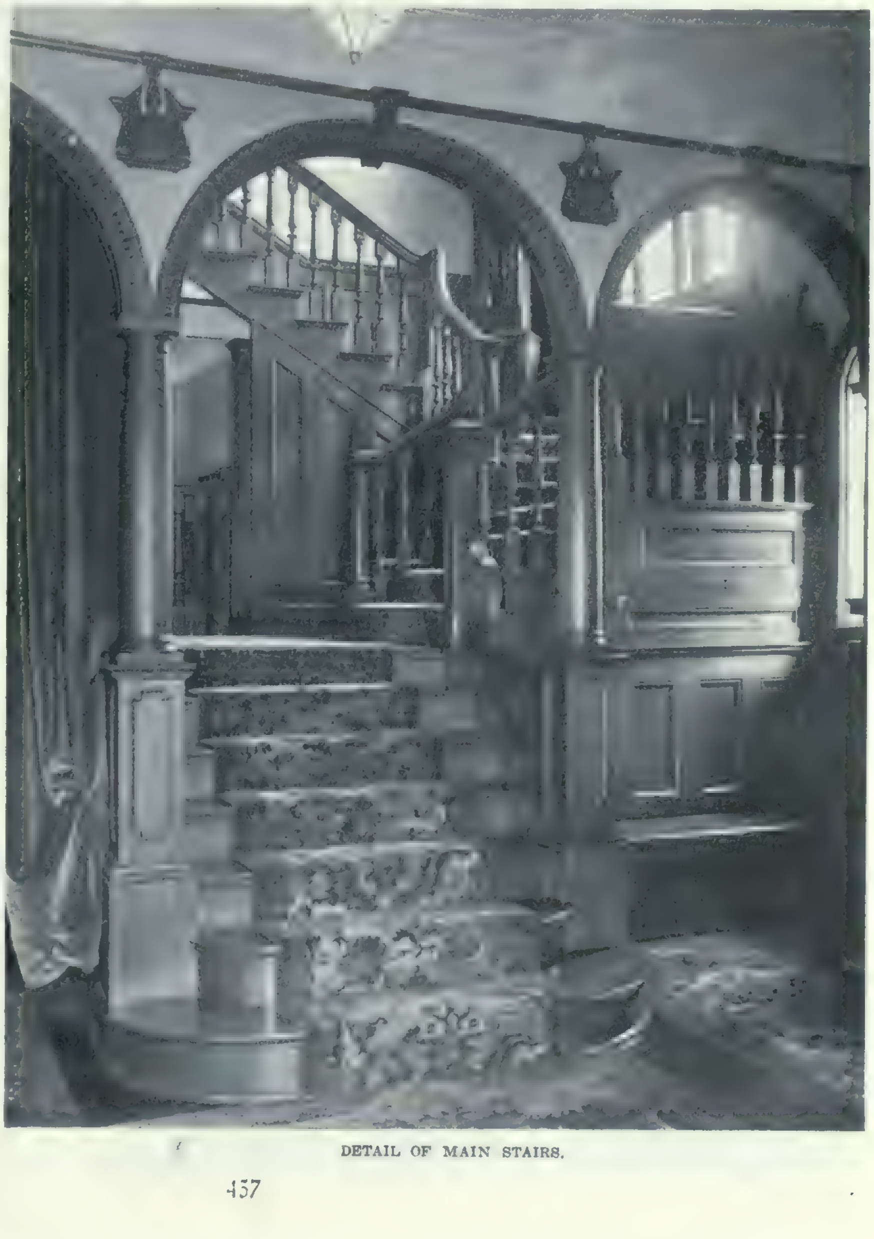
The house which forms the subject of this article faces on Sherbrooke street, at the corner of Elm avenue, on the lower level of Westmount, and stands on one of the few vacant building sites in that popular district. It was erected two years ago for Mrs. John Archibald.

The exterior walls are of rubbed ashlar, the stone used being a sandstone from the quarries at Nova Scotia. The stone is olive in color, and has only been on the market for a comparatively short period, but both as regards the qualities of strength and appearance it is one of the best Canadian sandstones available at the present time.

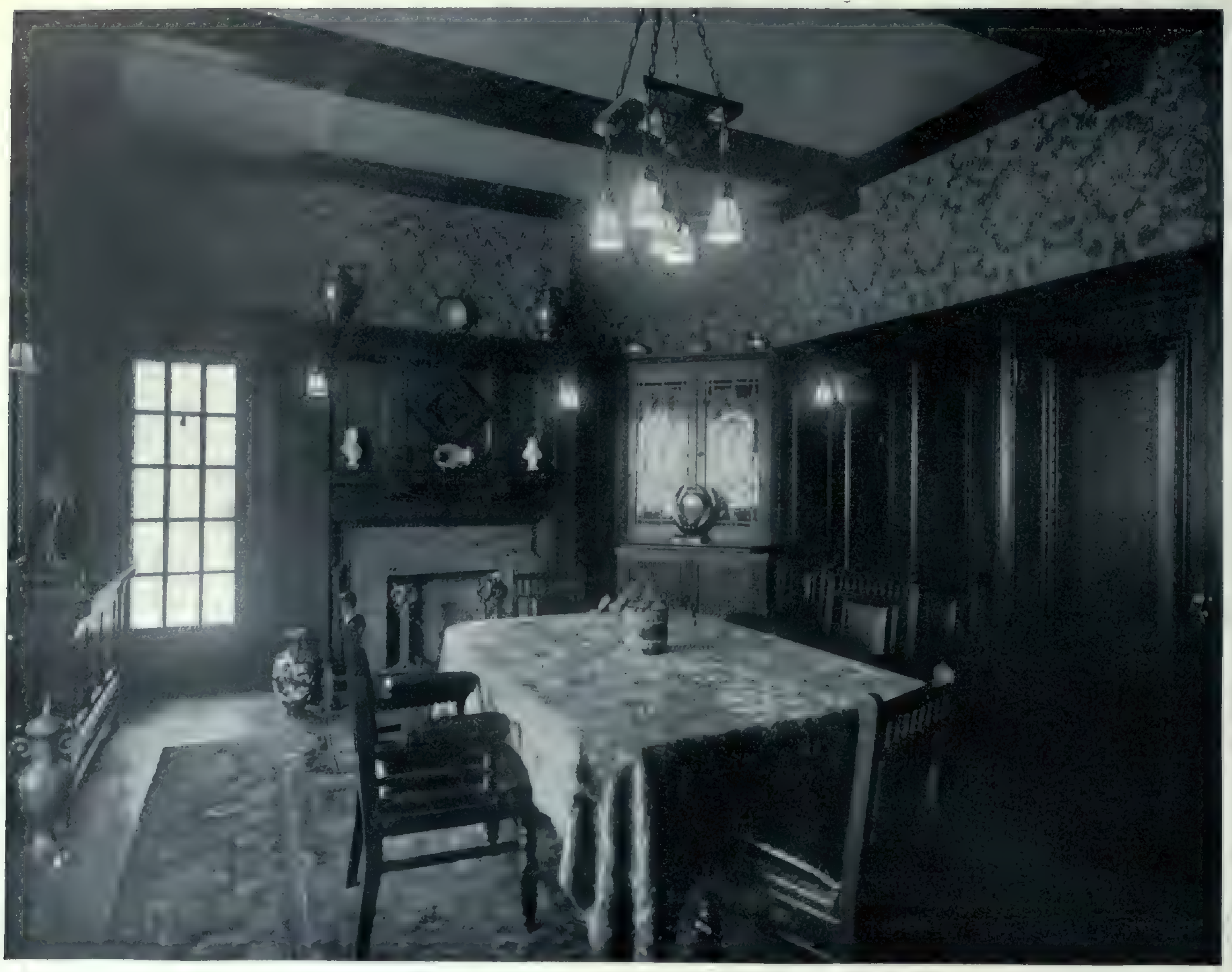
The exterior mouldings have been kept somewhat delicate in treatment, owing to the fine nature of the material. In the upper portion of the building the stone courses are arranged with alternate broad and narrow bands. The stone base, cornice and steps are of fine bush-hammered grey Montreal limestone, and the basement walls themselves are faced with squared rough-face rubble work. The roofs are covered with unfading American green slates and copper.

There are features in any plan which at first glance may be open to criticism. In this house, as is many others, the architect is often tied by special requirements of his client, and his own ideas and opinions of what is correct and proper in the general arrangement of the house have to yield to his client's views. How far an architect should give way on details which he is convinced would not meet with the good opinion of the public generally is a question not to be discussed in an article like the present.

It is becoming almost a vital point, if not a dictate of common sense, that the finishing and furnishing of the house must be considered with



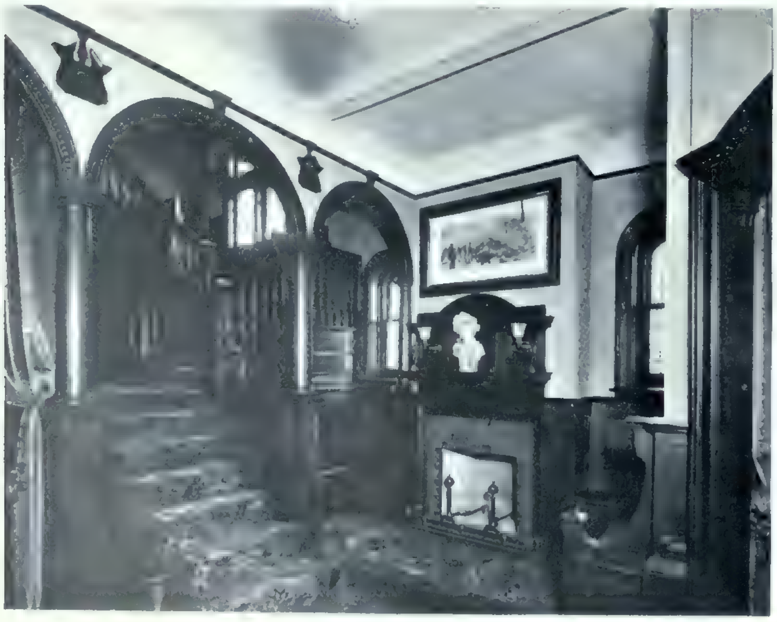
DETAIL OF MAIN STAIRS.



DINING ROOM.

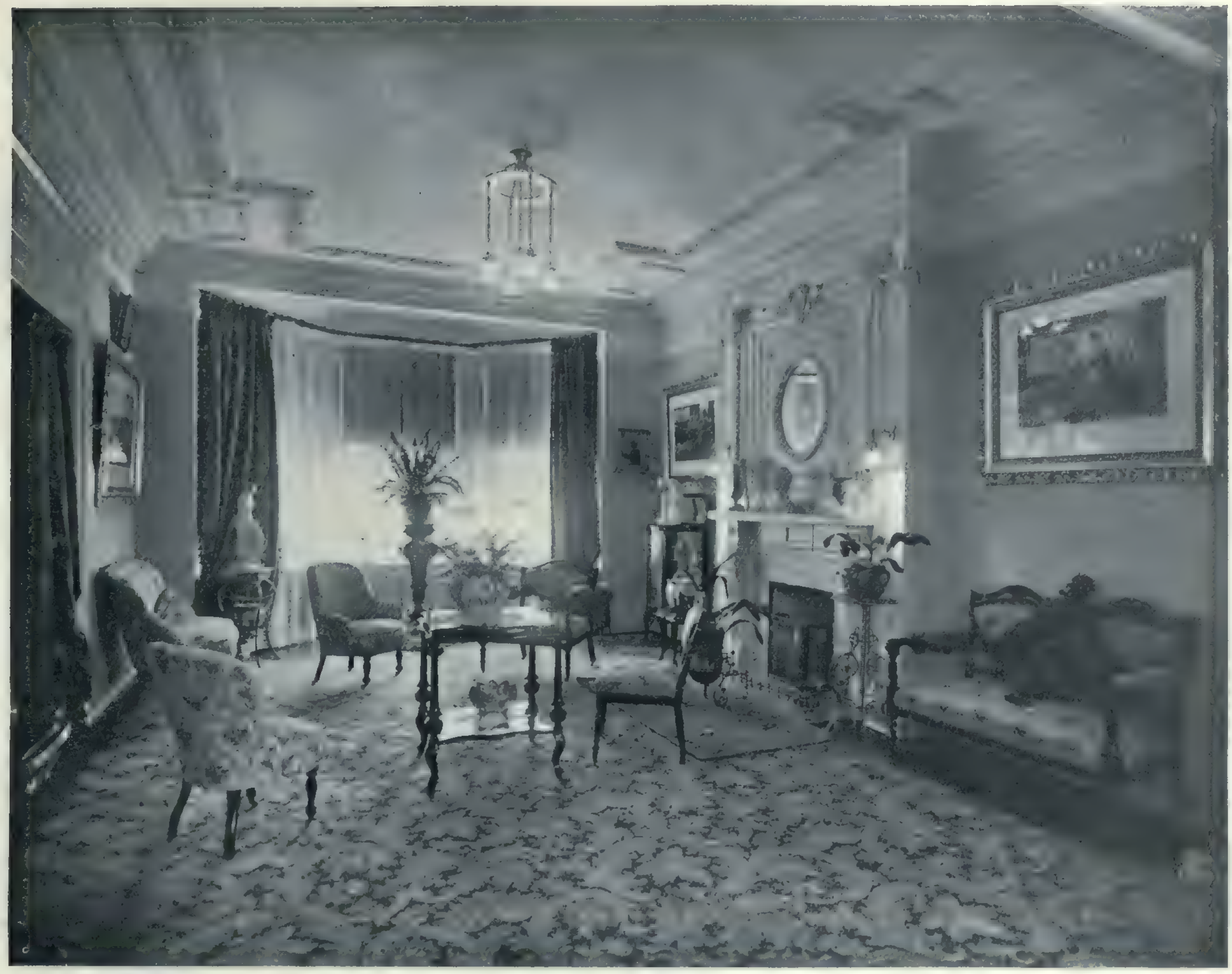
the house itself, not in the scrappy fashion which has so long prevailed in the indiscriminate throwing together of odds and ends without anything in common, a companionship of incompatibles.

In the furnishing of a house, the placing of pictures, the selection of carpets and rugs, the architect should be called in to give his advice if the interior is to be artistically a success, but such a procedure, from the writer's experience, seems to be the exception rather than the rule with the majority of clients. With many houses, alas, thoughtfully planned and carefully detailed interiors have been spoilt on account of the furnishings being out of keeping in style with the general character of the house.



ENTRANCE HALL.

The entrance vestibule of the Archibald residence is panelled in wood to a height of 7 ft. 6 in., with a marble mosaic floor, and door leading to the library. The main vestibule doors to the hall have glass panels formed into special geometrical pattern in lead cames, the glass used being of the various white varieties of Venetian, muffled and cathedral. The hall and staircase are also panelled; the whole of the woodwork here is of American whitewood stained to a dark brown color, with the exception of the treads of the stairs and floor, which are of oak. The staircase, which is one of the features of the interior, has an arcade of three arches on the ground floor hall. The centre arch being the



DRAWING ROOM.

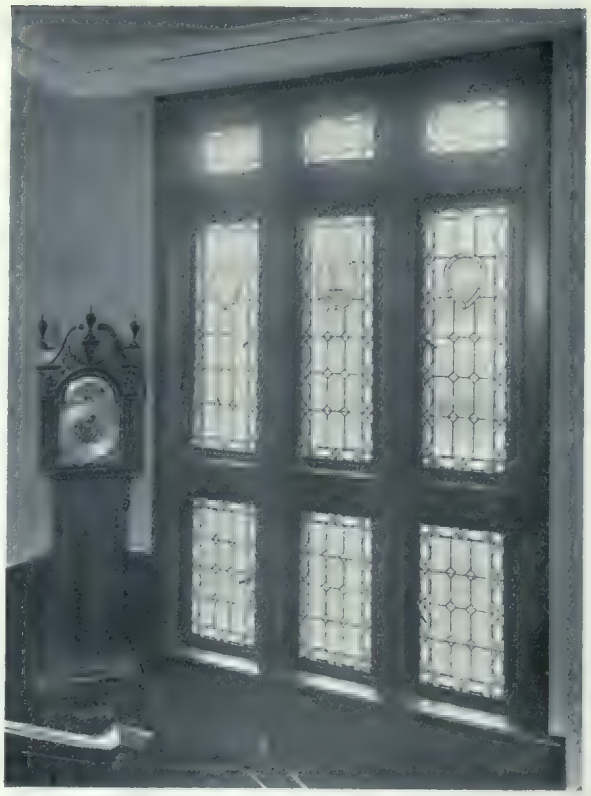
wider of the three forms the entrance to the stairs, one of the side arches giving access to the corridor to the dining-room, and the other encloses a seat by the side of the hall fireplace.

The termination of the stair balustrades is formed by special carved trusses. No radiators are visible in the hall, these being concealed under the stairs landing, and also under the seats adjoining the fireplace. The staircase window and hall windows have similar obscure white glasses as those in the vestibule doors, and are worked to the architect's designs in geometrical patterns. All the lights of the staircase window are fitted with metal casements; in the centre of which is the crest of the owner, with the motto, *Palma non sine pulvere* introduced. A coat room is provided next the stairs, this being so constructed that the space can be converted into a staircase at a later date, and thus give access to a billiard room in the basement.

On the left of the entrance is a large single sliding door opening into the large drawing-room, finished in dull white with an oak floor and two mantelpieces. These have crystallized tiles of golden shade around the fireplace openings. A division in the room is suggested by two columns and pilasters of yellow marble. The plastered ceiling and cornice were specially modelled, while the electric light fixtures are of silver, with gold opalescent glass shades.

The dining-room is panelled up to door height

DRAWING ROOM.



STAIRCASE WINDOW.

in oak, with oak beams and cornice. The panels are of one height, those in the doors being bevelled and raised with an enrichment on the molding. On opposite corners of this room are china cupboards with lead-glazed panels in the door. The lower part of one of these cupboards and the window seat enclose the radiators.

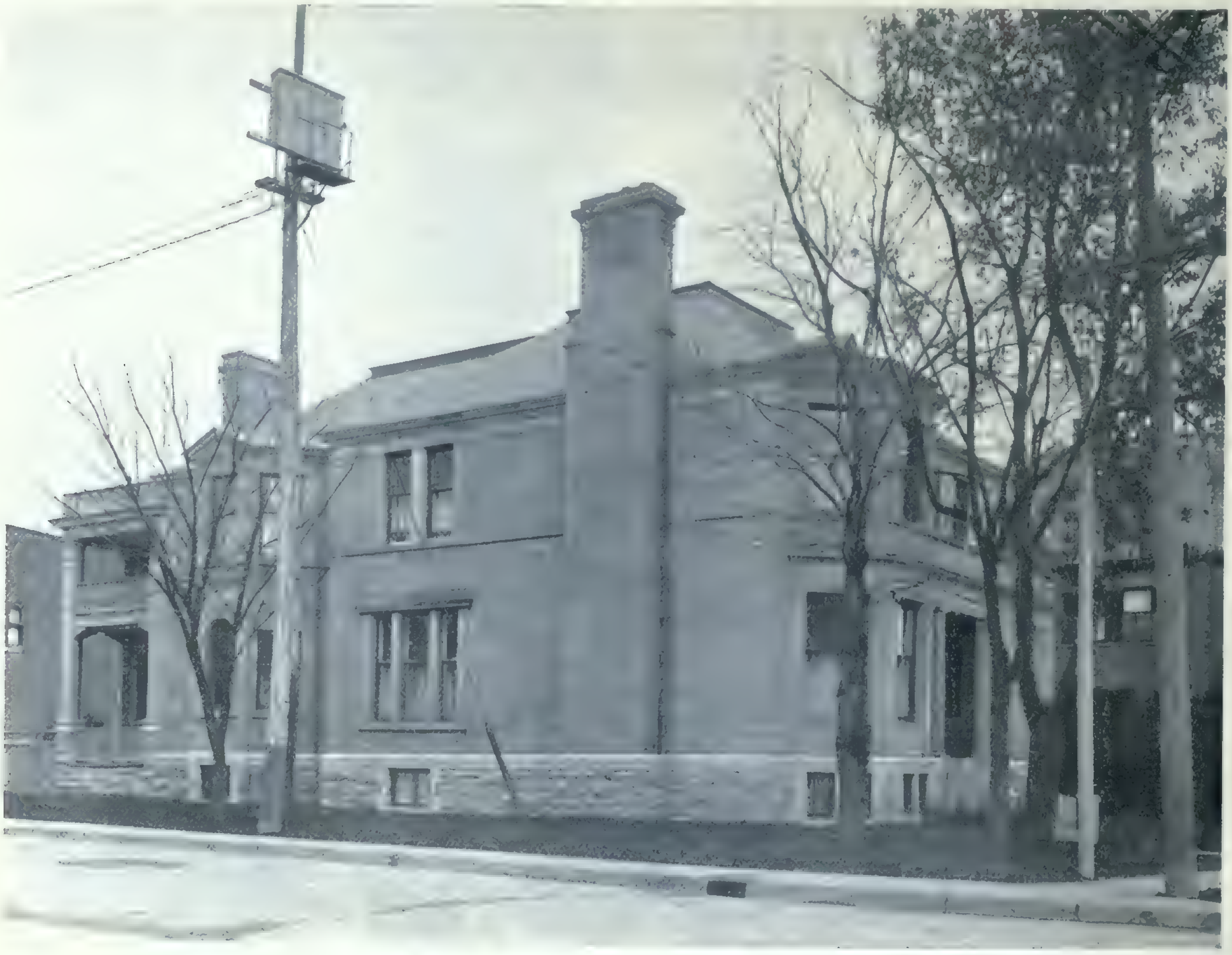
The serving pantry, with fittings all of cottonwood, is conveniently situated to the kitchen, dining and breakfast room.

The first floor hall is finished in American whitewood. At the head of the stairs is a large cedar cupboard, with the owner's bedroom to the right. Leading from this room is a large gallery. The bathroom is tiled throughout, and the linen room is fitted up with fronts to the various compartments which fall down, while the lower divisions are equipped with drawers.

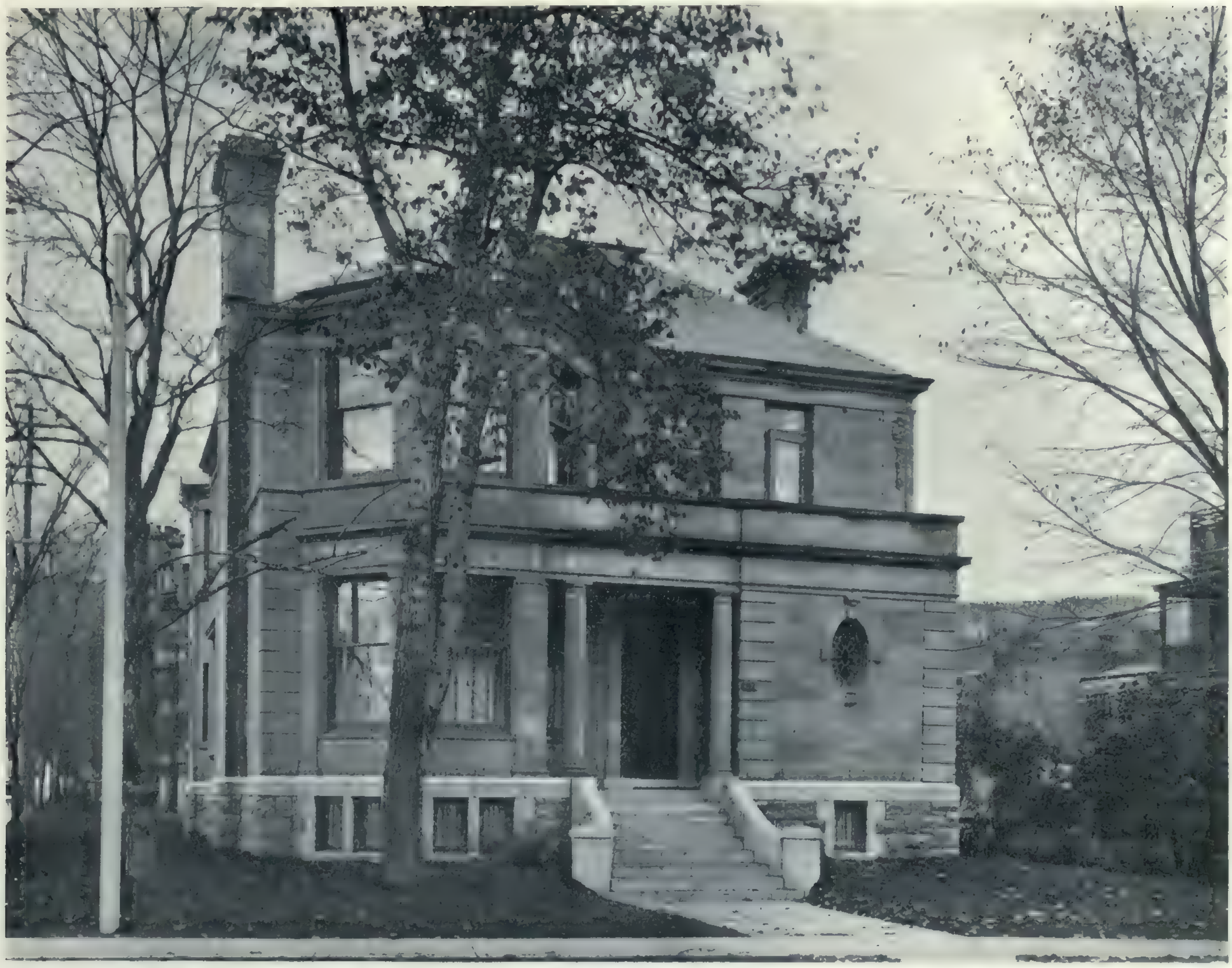
The maids' rooms are placed at the back of the house, as shown on the plans.

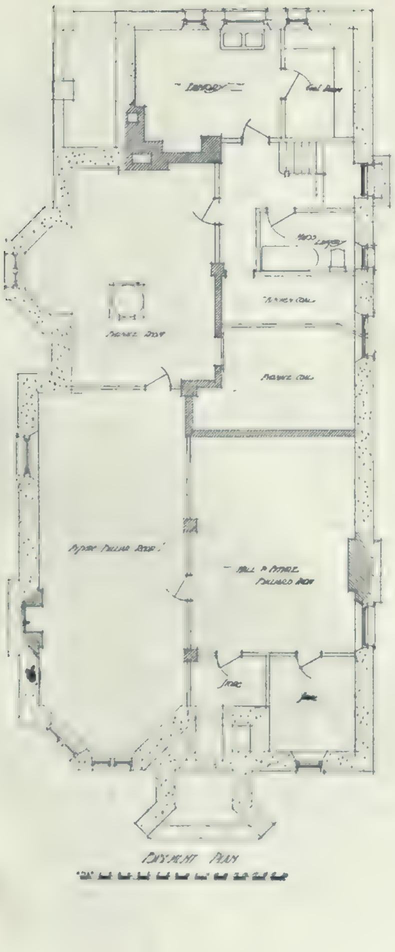
The house, the contracts for which amounted to $27,000, is fitted with a vacuum cleaning apparatus and other modern conveniences.

In this house, as in all types of buildings, the expense should not be the ruling factor. Quality is one's first consideration both upon the exterior and the interior. When we have succeeded in designing a front of character it is just as essential to put forward our best efforts to plan the interior with as much esthetic value, since the real home is within. In so doing we raise the standard of architecture in all residential work.

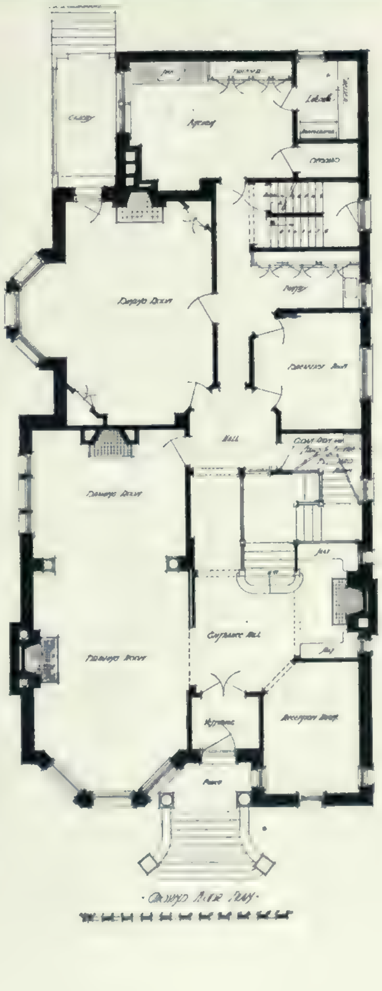


EXTERIOR VIEW OF HOUSE ON SHERBROOKE STREET, MONTREAL.





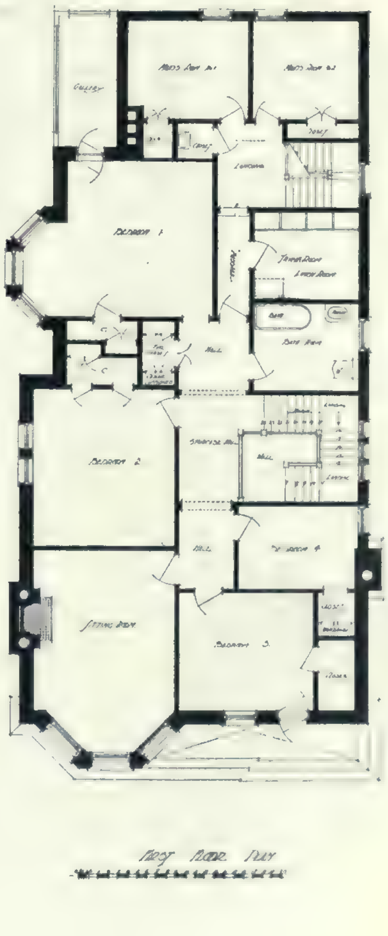
Basement Plan



· Ground Floor Plan ·

HOUSE ON
SHERBROOKE
STREET,
MONTREAL,
QUE.

PHILIP
J. TURNER,
ARCHITECT.



First Floor Plan

CONSTRUCTION

A · JOURNAL · FOR · THE · ARCHITECTURAL
ENGINEERING · AND · CONTRACTING
INTERESTS · OF · CANADA

FREDERICK REED, Editor

H. GAGNIER, LIMITED, PUBLISHERS
Corner Richmond and Sheppard Streets,
Toronto - - Canada

BRANCH OFFICES:
MONTREAL—171 St. James Street
NEW YORK—156 5th Avenue

CORRESPONDENCE.—All correspondence should be addressed to "CONSTRUCTION," Corner Richmond and Sheppard Streets, Toronto, Canada.

SUBSCRIPTIONS—Canada and Great Britain, $3.00 per annum. United States, the Continent and all Postal Union countries, $4.00 per anum, in advance. Single copies, 35c.

ADVERTISEMENTS—Changes of, or new advertisements must reach the Head Office not later than the twentieth of the month preceding publication, to ensure insertion. Mailing date is on the tenth of each month. Advertising rates on application.

CONTRIBUTIONS—The Editor will be glad to consider contributions dealing with matters of general interest to the readers of this Journal. When payment is desired, this fact should be stated. We are always glad to receive the loan of photographs and plans of interesting Canadian work. The originals will be carefully preserved and duly returned.

Entered as Second Class Matter in the Post Office at Toronto, Canada.

Vol.VII Toronto, December, 1914 No.12

TRADE NOTES

HAROLD S. CAPLAN, 75 Macdonell avenue, desires catalogues, price lists and samples from manufacturers of building materials and supplies.

* * *

M. BEATTY & SONS, LTD., have opened a Toronto district office in the Goodyear Building, 154 Simcoe street. This company was formerly represented by H. W. Petrie, Ltd., but henceforth will be under the direction of K. M. McKee. Mr. McKee, formerly of Welland, is a man of considerable experience and no doubt will become a potent factor in the future success of the firm's well prepared campaign for the coming year.

MESSRS. SMYTH & RYAN, Builders' supply dealers, 1327 Bloor street west, have been appointed distributors for "Medusa" waterproofing in Toronto and surrounding districts. It is a wholesome sign when large concerns like the Stinson-Reeb Builders' Supply Co., Ltd., who analyze the future situation so thoroughly, are constantly adding to their already efficient corps of workers. It is a precedent worthy of emulation.

* * *

THE Page Wire Fence Company at Walkerville report a large and increasing demand for their concrete reinforcement in flat sheets for use on municipal work. This material is unique in that it is put up in flat sheets, cut any desired length or width; lays flat without being weighted down, which makes it impossible for the concrete to buckle when setting. It is used not only in buildings and bridges, but is also finding considerable favor for road pavements. Many carloads have been used for this purpose in Sandwich, Windsor, Walkerville, Oakville, Aylmer, and other points in Ontario, as well as in the Province of Quebec. Samples are gladly sent on request.

* * *

SINCE its erection in 1910, the Amasa Stone Memorial Chapel of Adelbert College has proved to be unsatisfactory acoustically. The general shape of the building, which is one of the Western Reserve University group in Cleveland, Ohio, is a long and narrow rectangle 140 feet by 30 feet, and experiments showed the difficulty to be due to general reverberation. After repeated experiments from which Prof. F. P. Whitman showed that, for all practical purposes, the sounding board was useless, the H. W. Johns-Manville Co. was then asked to undertake the correction of the chapel by its system based on the scientific researches of Prof. Wallace C. Sabine of Harvard University. J-M acoustical treatment was supplied to the ceiling, panels and upper walls, and resulted in the elimination of all the acoustical defects.

* * *

AN ANNOUNCEMENT.

As one of the pioneers in the manufacture of drawing materials and surveying instruments in the United States, and to a limited extent in Canada, we thereby afford the local user the opportunity of purchasing goods of domestic manufacture.

This also means that under the present European situation that little, if any, embarrassment will be met with in our continuing to supply all our standard lines of manufacture.

Business as Usual.

EUGENE DIETZGEN CO., LTD.,
116 Adelaide St. W., Toronto.

CONSTRUCTION

INDEX TO VOLUME VII — JANUARY, 1914—DECEMBER, 1914

FRONTISPIECES—FULL PAGE ILLUSTRATIONS.

Title.	Month.	Title.	Month.
A Peasant's Home, Normandy, France	January	Colonial Entrance at Salem, Mass.	July
Garden of Alcazar, Seville, Spain	February	Proposed Civic Centre for Calgary	August
House at Hamilton, Ont.	March	View from Buckingham Palace, London	September
Mutual Life Assurance Co., Waterloo	April	Cathedral at Rheims, France	October
Court House, Vancouver, B.C.	May	Public Square at Antwerp, Belgium	November
Fort Garry Hotel, Winnipeg	June	New Dominion Bank Building, Toronto	December

ILLUSTRATIONS.

Exterior views denoted by Ex., Interiors by In., Plans by Pl.

Title and Location.		Architect.	Month.	Page.
APARTMENTS—				
Caroline Court, Vancouver	Ex., Pl.		May	177
Parisian	Ex., Pl.		August	315
BANKS—				
Chelsea, England	Ex.	Blomfield, R.	January	28
Dominion, Toronto	Ex., In., Pl.	Darling & Pearson	December.	426-456
Nationale, Ghent	Ex.		November.	398
BRIDGES—				
Kamloops, B.C.		Waddell & Harrington	March	116-117
Pont Au Change, Paris			September.	356
Pont de Alexander III., Paris			September.	358
Pont Des Invalides, Paris			September.	357
Pont de la Concorde, Paris			September.	357
Pont L'Alma, Paris			September.	355
Pont Neuf, Paris			September.	359
Pont Royal, Paris			September.	354
CATHEDRALS—				
Abbeville, France	Ex.		October	370
Amiens, France	Ex., In.		October	368-369
Chalons, France	In.		October	377
Laon	Ex., In.		October	372-373
Malines	Ex.		November.	394
Mons	In.		November.	394
Rheims, France	Ex., In.		October	365-366
Rouen, France	Ex., In.		October	372, 376
Soissons, France	Ex., In.		October	374-375
CHURCHES—				
Camden, N.J.	Ex.		June	245
St. Gommaire at Lierre	Ex., In.		November.	404
St. Ouen, Rouen	Ex.		October	371

ILLUSTRATIONS—*Continued.*

Title and Location.		Architect.	Month.	Page.
CITIES—				
Dinant, Belgium			November.	393
Louvain			November.	394
Termonde			November.	394
CITY PLANS—				
Calgary	Pl.	Mawson, Thomas & Sons	August	313
Canberra	Pl.	Griffin, W. B.	August	19
Charing Cross, London	Ex., Pl.		September	342-343
Civic Centre Scheme		Somervell & Putman	May	171
Cleveland	Pl.		August	318-319
Halifax Ocean Terminals	Ex., Pl.	Ross & Macdonald	September.	349-352
International Word Centre	Ex., Pl.	Anderson, H. C.	September.	338
Model Rome	Ex.	Bigot, M.	August	314
COTTAGES—				
Churchill, England.	Ex., Pl.		March	102
Corstorphine, Scotland	Ex.		August	322
Earlswick, England	Ex.		March	99
English Competitive Designs	Ex., Pl.		July	287-301
Girard Estate, Philadelphia	Ex., Pl.		March	103
Hamstead Garden Suburb, England	Ex., Pl.		March	100-101
Port Sunlight, England	Ex.		March	104-105
Rugby, England	Ex.	Lutyens, E. L.	March	97
Scotland	Ex.		August	323
Toronto Housing Company	Ex., Pl.	Smith & Sons, Eden	March	106-114
FOUNTAINS—				
Cologne			August	317
Dijon			August	320
Madrid			August	316
Versailles			August	320
GATES—				
Ardon, Laon, France			October	367
Fortification of Antwerp	Ex.		November.	397
Potsdam, New Palace	Ex.		August	326
GALLERIES—				
Art Gallery, Montreal	Ex., In., Pl.	Maxwell, E. & W. S.	January	6-15
Music, Paris	Ex.		September.	347
Palais des Beaux Arts, Brussels	Ex.		November.	395
GARDENS—				
Boboli, Florence, Italy			August	320
Corstorphine, Scotland			August	322-323
Dresden Park	Ex.		August	329
Embankment, London	Ex.		September.	345
Fontainebleau	Ex.		August	329
Formal Gardens	Ex., Pl.		February	35-45
Luxembourg, Paris			August	316
Palais Royal, Paris			August	320
Royal Palace, Vienna			August	328
Sunken Pool, Hampshire, England	Ex.		February	72
Tuilleries, France			August	317
HOUSES—				
Brussels	Ex.		November.	408
Chicago, Two Small	Ex., Pl.		May	207
Competition, Small Brick			July	304-307
Cottages, Rugby, England	Ex.	Lutyers, E. L.	March	97
Crawley Court, Hampshire	Ex., In., Pl.		January	16-22
Francis I., Abbeville, France			October	370
Great Neck, N.Y.	Ex.		June	241
Hamilton, Ont.	Ex.	New, H. H.	March	78
Montreal, Drummond Street	In., Pl.	Maxwell, E. & W. S.	July	267-274
Montreal, Sherbrooke Street	Ex., In., Pl.	Turner, P. J.	December.	457-461
Montreal	Ex., Pl.	Turner, P. J.	March	91-96
Montreal	Ex., Pl.	Pedan & McLaren	March	94-95
Montreal	Ex., In., Pl.	Wechselberger, J. S.	November.	412-415

ILLUSTRATIONS—*Continued.*

Title and Location.		Architect.	Month.	Page.
Mountain Station, N.J.	Ex., Pl.	Squires & Wynkoop	July	303
Schaerbeek, near Brussels	Ex.		November.	309, 409
Silsbee House, Salem, Mass.	Ex.		November.	421
Toronto	Ex., Pl.	Chadwick & Beckett	March	82-85
Toronto	Ex., In., Pl.	Smith & Sons, Eden	March	83
Toronto	Ex., Pl.	Simpson, Henry	March	86-88
Toronto	Ex., Pl.	West, Gordon M.	March	89-90
Toronto	Ex., Pl.	Smith, H., Eden	July	276
Toronto	Ex., Pl.	Brown, J. Francis	July	277
Toronto	Ex., Pl.	Herbert, F. H.	July	280
Toronto	Ex., In., Pl.	Chadwick & Beckett	July	281
Toronto	Ex., Pl.	Molesworth, George N.	July	282, 285
Toronto	Ex., Pl.	Wilson, Ewart G.	July	284
Toronto	Ex., Pl.	Yeigh, E. H.	July	286
Vancouver	Ex.	Maclure & Fox	May	169
Vancouver	Ex.	Robertson, T.	May	169
Vancouver	Ex.	Somervell & Putman	May	174
Vancouver	Ex.	Grant, Henderson & Cook	May	175, 179
Vancouver	Ex.	Fripp, Mackay R.	May	179
Villa at Niveze, near Spa	Ex.		November.	400
Villa at Spa	Ex.		November.	408-409
Villa at Uccle, S. of Brussels	Ex.		November.	401
Winnipeg	Ex., In., Pl.	Woodman & Carey	July	254-256
Winnipeg	Ex., Pl.	Ross & Macdonald	July	257-258
Winnipeg	Ex., In., Pl.	Holyoke, T. G.	July	259
Winnipeg	Ex., Pl.	Semmens, J. N.	July	262
Winnipeg	Ex., Pl.	Atchison, J. D.	July	263
Winnipeg	Ex., Pl.	Nichols, W. F.	July	264
Winnipeg	Ex., Pl.	Jordan & Over	July	266
HOSPITALS—				
Toronto, for Sick Chlidren	Ex., In., Pl.	Stephens & Lee	October	378-381
HOTELS—				
Brussels	In.		November.	405
Vancouver	Ex.	Swales, F. S.	May	178
Fort Garry	Ex., In., Pl.	Ross & Macdonald	June	215-235
LIBRARY—				
Public, Columbus	Ex.		September.	3[illegible] ~~246~~
MEMORIAL—				
Hill, Ann Arbor	Ex.		June.	246
Lincoln	Ex., Pl.		September.	340-341
Norman Shaw		Lethaby, W. R.	September.	361
MUSEUM—				
Walters, Baltimore	Ex.		September.	347
OFFICE BUILDINGS—				
Bell Telephone Co., Toronto	Ex.		April	124
Birks Building, Vancouver	Ex.	Somervell & Putman	May	178
Chapman & Walker, Toronto	Ex., Pl.	Chadwick & Beckett	April	142
Cooper Cap Co., Toronto	Ex., Pl.	Feldman, I.	April	143
Crown Tailoring Co., Toronto	Ex., Pl.	Wagner, C. F.	April	139
Dominion Trust Building, Vancouver	Ex.		May.	173
Hermant Building, Toronto	Ex., Pl.	Bond & Smith	April	141
Mutual Life Assurance Co., Waterloo	Ex., In., Pl.	Darling & Pearson	April	125-135
Rogers Block, Vancouver	Ex.		May	172
Temple-Pattison, Toronto	Ex., Pl.	Denison & Stephenson	April	140
T. J. Foy Co., Toronto	Ex., In., Pl.	Curry & Sparling	April	136-137
Vancouver Block, Vancouver	Ex.		May	170
Wolseley Motor Co., Toronto	Ex., Pl.	Lennox, E. J.	April	138
Yorkshire Block, Vancouver	Ex., Pl.		May	176
PALACE—				
Potsdam	Ex.		September.	344
Royal, Belvedere, Vienna			August	328

ILLUSTRATIONS—*Continued.*

Title and Location.		Architect.	Month.	Page.
PLAYGROUNDS—				
Elevated, New York City			August	331
Jersey City			August	324
San Francisco, Cal.			August	325
San Juan			August	325
Spokane, Wash			August	324
PUBLIC BUILDINGS—				
Chateau Gerard la Diable, Ghent	Ex.		November.	398
Clothiers' Guild at Ypres	Ex.		November.	403
Court House, Vancouver	Ex.	Rattenbury, F. M.	May	166
Hall of Clothiers' Guild, Ghent	Ex.		November.	398
Hotel de Ville, Lierre	Ex., In.		November.	396
Hotel des Postes, Ghent	Ex.		November.	398
Hotel des Postes, Ostend	Ex.		November.	411
Maison du Roi, Brussels	Ex.		November.	403
Mexico	Ex.		April	144-152
Palais de Justice, Antwerp	Ex.		November.	410
Palais des Beaux Arts, Brussels	Ex.		November.	395
Perkins Institution, Watertown	Ex.		August	327
Town Hall, Bruges	Ex.		November.	406
Town Hall, Louvain	Ex.		November.	407
Town Hall, Oudenarde	Ex.		November.	397
RAILWAY STATIONS—				
Grand Central Terminal	Ex., Pl., In.		August	332-333
Toronto Union	Ex., Pl., In.	Ross & McDonald	May	199-202
THEATRES—				
New Lyric, Antwerp			November.	406
UNIVERSITY BUILDINGS—				
Ghent	Ex.		November.	402
Hart House, Toronto	In.	Sproatt & Rolph	May	203
Hill Auditorium, Ann Arbor	Ex.		June	246
Y.M.C.A.—				
Central, Toronto (plate IX.-X.)	Ex., In., Pl.	Burke, Horwood & White	February	51-60
TEMPLES—				
Masonic, Toronto (First Prize)	Ex., In., Pl.	Knowles, H. P.	May	180-185
Masonic, Toronto (Second Prize)	Ex., In., Pl.	Lyle, John M.	May	186-190
Masonic, Toronto (Third Prize)	Ex., In., Pl.	Hutchison, Wood & Miller	May	191-194
Masonic, Toronto (Fourth Prize)	Ex., In., Pl.	Gould & Harvey	May	195-198

ILLUSTRATIONS ACCORDING TO AUTHOR.

Architect.	Kind and Location.	Month.	Page.
Atchison, John D. & Co.	House, Winnipeg	July	263
Bigot, M.	Model of Rome	August	314
Blomfield, R.	Bank, Chelsea	January	28
Bond & Smith	Office, Toronto	April	141
Brown, J. Francis	House, Oakville	July	277
Burke, Horwood & White	Y.M.C.A., Toronto	February.	51-60
Chadwick & Beckett	House, Toronto	July	281
Chadwick & Beckett	Store, Toronto	April	142
Chadwick & Beckett	Houses, Toronto	March	82-85
Curry & Sparling	Warehouse, Toronto	April	136-137
Darling & Pearson	Dominion Bank, Toronto	December	426-456
Darling & Pearson	Life Assurance Co., Waterloo	April	125-135
Denison & Stephenson	Office, Toronto	April	140
Feldman, I.	Factory, Toronto	April	143
Fripp, Mackay R.	House, Vancouver	May	179
Gould & Harvey	Masonic Temple, Toronto	May	195-198
Grant, Henderson & Cook	House, Vancouver	May	175-179
Herbert, F. H.	House, Toronto	July	280

ILLUSTRATIONS ACCORDING TO AUTHOR—*Continued.*

Architect.	Kind and Location.	Month.	Page.
Holyoke, T. G.	House, Winnipeg	July	259
Hutchison, Wood & Miller	Masonic Temple, Toronto	May	191-194
Jordan & Over	House, Winnipeg	July	266
Knowles, H. P.	Masonic Temple, Toronto	May	180-185
Lennox, E. J.	Motor Car Co., Toronto	April	138
Lethaby, W. R.	Norman Shaw Memorial	September	361
Lutyens, E. L.	Cottages, Rugby, England	March	97
Lyle, J. M.	Masonic Temple, Toronto	May	186-190
Lyle, J. M.	Toronto Union	May	199-202
Maxwell, E. & W. S.	Art Gallery, Montreal	January	6-15
Maxwell, E. & W. S.	House, Montreal	July	267-274
Maclure & Fox	House, Vancouver	May	169
Mawson, Thos. & Sons	City Plan, Calgary	August	313
Molesworth, George N.	House, Oakville	July	282-285
New, Herbert, H.	House, Hamilton, Ont.	March	78
Nichols, D. W. F.	House, Winnipeg	July	264
Pedan & McLaren	Houses, Montreal	March	94-95
Ross & Macdonald	Hotel, Winnipeg	June	215-235
Ross & Macdonald	Railway Station, Toronto	May	199-202
Ross & Macdonald	Houses, Winnipeg	July	257-258
Ross & Macdonald	Ocean Terminal, Halifax	September	349-352
Rattenbury, F. M.	Court House, Vancouver	May	166
Robertson, T.	House, Vancouver	May	169
Semmens, J. N.	House, Winnipeg	July	262
Simpson, Henry	Houses, Toronto	March	86-88
Smith, H., Eden	House, Toronto	July	276
Smith & Sons, Eden	Cottage Flats, Toronto	March	106-114
Smith & Sons, Eden	House, Toronto	March	83
Somerville & Putnam	Birks Building, Vancouver	May	178
Somerville & Putnam	House, Vancouver	May	174
Sproatt & Rolph	Hart House	May	203-204
Squires & Wynkoop	Houses, Mountain Station, N.J.	July	303
Stephens & Lee	Hospital, Toronto	October	378-381
Swales, F. S.	House, Vancouver	May	178
Turner, Philip J.	House, Montreal	March	91-96
Turner, Philip J.	House, Montreal	December	457-461
Waddell & Harrington	Bridge, Kamloops, B.C.	March	116-117
Wagner, C. F.	Store, Toronto	April	139
Wechselberger, Jos.	House, Montreal	November	412-415
Woodman & Carey	House, Winnipeg	July	254-256
West, Gordon M.	House, Toronto	March	89-90
Wilson, Ewart G.	House, Toronto	July	284
Yeigh, E. H.	House, Toronto	July	286

ARTICLES.

	Month.	Page.
Advertising matter, standardization of	November	419
American architecture as seen by Moriyama	January	29
Architectural chair at University of Manitoba	April	162
Art Gallery, Montreal, with illustrations	January	7
Artificial stone, specifications for	February	75
Assurance Company, Mutual Life at Waterloo	April	127
Belgium, the architecture in war zone	November	367
Bricks and brickmaking, by A. E. Brown	June	237
Bridge at Kamloops, B.C., of lift type	March	116
Bridge structure by pneumatic method	April	153
Builders' Exchange Annual Convention	March	119
Canberra, programme for Parliament House	October	387
City planning and financing, by A. W. Crawford	August	312
City planning of streets, by G. B. Ford	June	249
Competition for a brick house to cost $7,500	July	305
Cottage designs, Country Life competition	July	287
Crawley Court, Hampshire, England	January	17
Dominion Bank building at Toronto	December	427
Dominion Bank, the mechanical equipment	December	447

ARTICLES—*Continued.*

	Month.	Page.
Engineering books of value	April	160
Engineering books of value	May	206
Fire prevention, with statistics	February	74
France, the architecture in war zone	October	395
Garden city movement, with illustrations	March	99
Garden, formal, by F. R. Major	February	61
Heating the small house	March	98
Hospital for Sick Children, Toronto	October	379
Hotel, new Fort Garry at Winnipeg	June	217
House, reinforced construction of Hart House	May	203
House, the narrow city lot problem solved	November	412
House on Sherbrooke street, Montreal	December	457
House on Drummond street, Montreal	July	267
Houses in Toronto and vicinity	July	275
Houses under $15,000 at Winnipeg, by F. N. Ruttan	July	255
Houses, inexpensive examples in Toronto	March	81
Houses costing under $5,000 in Montreal	March	91
Houses, how to get cheap, by G. F. Beer	March	106
Housing, third national conference	March	114
Masonic Temple, Toronto, by C. H. Boyles	May	181
Metal lath, copper alloy retardant	October	382
Mexico of yesterday and to-day, by F. R. Major	April	145
National Brick Manufacturers' Association	April	162
Ocean terminals at Halifax, with illustrations	September	349
Office and loft buildings in Toronto	April	137
Oil paint's adherence to cement	April	161
Ontario Association of Architects' Convention	November	416
Playgrounds, elevated on piers, roofs, etc	August	331
Playgrounds, size and distribution	August	321
Railway station at Toronto, the new Union	May	199
Rapid transit, subway, elevated and open cut	September	353
Residential districts, as to their protection	September	339
Royal Gold Medal for 1913	January	23
Vancouver, B.C., its growth in architecture	May	171
Y.M.C.A., Central at Toronto	February	53

EDITORIALS.

	Month.	Page.
Belgium, a peace-loving nation at war	November	393
Belgium, terrible disaster befalling it	October	365
Billboard Nuisance, action taken	June	214
Canada, her present and future attitude	December	425
Canadian Clubs, there potency in political life	May	167
City Planning, first International Conference	June	213
City Planning, great need of exhibitions	January	3
City Planning, sixth national conference	August	311
City Planning, sixth national conference	May	168
City Planning, the future outlook for Canada	November	393
City Planning, the zone system in Europe	Januray	4
Dominion Bank Building, esthetic and practical	December	425
Excavations, works of art discovered	January	4
Fire, reasons for our great loss in Canada	April	123
Gardening, rapid growth in twentieth century	February	49
Graduated schedule of charges on buildings	February	50
Hotel, construction, decoration and equipment	June	213
House, in relation to its general surroundings	March	79
House, an expression of the owner's personality	July	253
Housing conference held in Cincinnati	March	79
Panama Canal and the Panama Pacific Exposition	January	3
Quantity system in estimating buildings	February	49
Registration of architects in England	March	80
Royal Gold Medal for 1913, its great value	January	4
Tapestries brought to America and their value	April	124
Unionization of architectural profession	February	50
Vancouver, its development in architecture	May	167
War, Canada's outlook for the future	September	337
War, loss to art and civilization	September	337